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ICL may be reported to Monopolies Commission

THE Office of Fair Trading is close to referring ICL to the Monopolies and Mergers Commission. The move follows complaints from several independent suppliers of used ICL computers and ICL-compatible equipment, about ICL's alleged monopolistic practices.

If the OFT goes ahead it will ask the Commission to look into the whole computer market rather than ICL specifically, because it is not allowed to refer one named company to the Commission.

Under definitions in the 1967 Fair Trading Act, a monopolistic situation can exist if one company holds at least one quarter of a particular market and prevents, distorts or restricts competition in the supply of goods or services.

The OFT has been looking into the ICL case for some time (CW, June 23, 1977). Used ICL computer vendors, Reliance Computer Brokers and Computer Resale Brokers, have complained about ICL's refusal normally to maintain machines at second user sites if they are more than seven years old.

Systems Reliability Ltd and Teknos Management, which build add-on memory and plug compatible disc subsystems, respectively, for ICL machines, complained about the technical and pricing obstacles that ICL has constructed to discourage or prevent users from installing their kit. One particular cause of discontent has been the 20% compensatory levy that ICL demands from users that install their kit, a policy which ICL has doggedly refused to change.

Teknos and Systems Reliability have also complained to the EEC Commission's Directorate of Restrictive Practices and Abuse of Dominant Positions about ICL policies (CW, September 21, 1978).

If ICL is found to be infringing articles 85 and 86 of the Treaty of Rome ICL could not only be forced to change its policies; it could also be fined up to 10% of its previous year's turnover — more than £500 million last year. ICL would have the right of appeal to the European Court of Justice.

NEWS IN BRIEF

Low Threshold response

POOR response to advertisements for Threshold computer training courses in the Bristol area have caused NCC staff serious difficulty in getting courses organised. A newspaper campaign had to be repeated before the necessary 45 young people had applied so that a single course of 16 could be filled. The pass rate for the aptitude test is about one in three.

This is despite unemployment of 5,000 teenagers in Avon, but plenty of white-collar vacancies.

GA sues ex-boss

THE legal slugging match between General Automation and ousted president Larry Goshorn is hotting up. Following Goshorn's second suit against them alleging that he was barred from GA premises (CW, July 5), the directors are suing Goshorn, saying he wasted corporate assets on personal road and air travel.

DEC price cuts

PRICE cuts ranging between 11% and 60% have been announced by the Digital Equipment Corp for add-on MOS memory for PDP-11/34A, 11/70 and Vax-11/780 computers.

October Times?

STEADY progress has been made in talks at The Times with some print unions, allowing for staff cuts and a disputes procedure as asked for by the management, while other difficulties persist, such as what will happen to management members of the NGA who crossed picket lines. The Times wants a "no victimisation" agreement to apply on both sides. Staff remain optimistic that publication could restart on October 1.

Magnuson in UK ahead of schedule

THE IBM-compatible M80 series of mainframes built in the US by Magnuson Computer Systems is now being offered to the general IBM computer using community in the UK by Magnuson ATC, the independent agency set up late last year to sell Magnuson machines to the European air transport industry.

Magnuson ATC said that general marketing of M80s in the UK was originally intended to start in September, following the formation of a Magnuson subsidiary, Magnuson Ltd, but the level of interest in M80s was now so high that Magnuson ATC had decided to handle general sales until Magnuson Ltd was established.

Magnuson ATC is currently looking for a large software house with substantial IBM experience to provide Magnuson users with systems engineering support, and Data Logic is considered to be the most attractive proposition. Data Logic confirmed that negotiations with Magnuson ATC had started, but emphasised that any agreement that might be signed was at least one month away.

Data Logic has considerable experience in IBM 370 project implementation through its professional services division, which has offices in London, Manchester and Birmingham.

Magnuson ATC is currently also evaluating third party maintenance companies, and says that it will probably sign agreements with two of them.

CW gives £1,000 boost to micro awareness

A PLAN to increase awareness of microprocessors among schoolchildren gained a £1,000 boost last week when the proceeds of the 1979 Computer Weekly Charity Ball were handed over to Dr Leslie Jackson, chairman of the British Computer Society's computer education group, by Computer Weekly's new editor, John Kavanagh.

The group, which has 33 branches and 2,400 members, including 400 overseas, exists to further the introduction of computer studies in secondary schools. It will use the CW donation to put together a portable, free-standing display to promote micro awareness. The display will be available to schools for open days, exhibitions, parent evenings or to support a lecture.

The BCS feels that on a wider scale the CW award will be useful in identifying the type of display which can be built and the advantages of replicating it on a national scale. It could thus guide the Department of Industry in the spending of some of its funds for the Microprocessor Awareness Project.

The CW ball, now widely regarded as the computer industry's major social event, will be held this year on Friday, October 12, at London's Royal Lancaster Hotel. Tickets are £17. Further information and tickets can be obtained from CW's editorial director, Chris Hipwell, at Dorset House, Stamford Street, London SE1 9LU.

IBM seeks $1,500m loan

UNDERLINING the difficulty of running even a company as strong and successful as IBM, second-quarter net profit fell 3.4% to $667 million — and IBM is seeking to borrow up to $1,500 million only a year after spending $1,340 million buying its own shares.

After the 3030 series, which generated an embarrassingly higher level of orders than IBM anticipated, the company hoped to match supply to demand with the 4300s. But in the US, deliveries are spread over three years and in the UK, anyone ordering a 4331 this week would get it in two years, and a 4341 in 2½ years.

IBM's reserves have fallen from over $6,000 million in 1976 to $3,900 million at March 31. For the first time since 1967, the company is seeking to open lines of credit with a number of banks and wants the money to finance increased production.

The second-quarter profit decline is the first since 1975 and surprised Wall Street, where the stock fell $1.50 to $70.125 on the news. IBM attributed the decline primarily to the trend towards leasing, but leasing revenues rose only 8.3% in the second quarter.

Ford order

MICROPROGRAMMABLE GA 16 series minis and micros worth £500,000 from General Automation are to run five process control and monitoring systems at the new Ford engine plant in Bridgend, Glamorgan. Ford has been using General Automation minis for engine monitoring at Dagenham.

Racal into automated office

● From front page

management system, and a system for telephone operators which provides the information necessary to enable operators to direct incoming calls to the right person and find a substitute if necessary.

The dental management system looks after patient records, NHS accounts and patient billing, and even handles limited graphics for displaying charts.

Racal has a major need for intelligent terminal systems within its own operating companies, and development of these will be one of the first tasks of the new company.

Peter Hare, who joined Racal from ICL some years ago, will be director in charge of Racal Information Systems.

"Although we shall be looking for plenty of business from large companies which are already Racal-Milgo customers for communications equipment, we shall also be selling to small companies.

"We do not intend to go round knocking on doors: we shall be exhibiting at the International Business Show in Birmingham, and expect that in general inquiries will come to us," he told Computer Weekly.

The terminals division in the US will not become part of the new company in the foreseeable future.

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Clearing the way

● From front page

2900 software to the 1900 environment fits into the same pattern of easing the transition path to 2900 and goes under the banner of SME, simulated machine environment.

Unlike DME, SME is essentially a concept rather than a product, and stems from studies at the third shared filestore site, W. D. & H. O. Wills, in Bristol.

According to Graham Venables, who is responsible for systems programming at Wills and who originated the concept, SME followed from Wills' realisation that it could not afford 2900 conversion on a reasonable timescale with the tools then available.

It therefore put together a list of the facilities it would need to complete the bulk of the conversion while still operating in 1900 mode. Since then, ICL has adopted SME as an "umbrella" covering current and future transition aids.

The ability to run VME/BE under George 3 is a major requirement for SME, and is being worked on by ICL Dataskil. The Dataskil product involves building a new coprocessor interfacing George at the Syscall level; it could be available next year.

Another key component is a VME/B Cobol compiler which is being implemented by ICL for 1000 mode systems and C2.

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Joseph quells ICL takeover fears

FEARS that ICL will fall under the control of a foreign company if the National Enterprise Board sell off its 25% stake, have been firmly quelled by Sir Keith Joseph.

Following his Commons pronouncement on the future of the NEB last Thursday, the Industry Secretary said that "for reasons of national interest", he would not allow the NEB to place its shares in ICL or Ferranti with a foreign company.

The bulk of the shares will almost certainly end up with pension funds, unit trusts and insurance companies, although employees of ICL and Ferranti are also likely to be given the opportunity to subscribe for shares in their companies.

Sir Keith's statement implies that the national interest argument would also be invoked if a foreign company tried to launch a bid for ICL. There are several mechanisms by which the government can block an unwelcome bid for a UK company from abroad, the simplest being a reference to the Monopolies Commission.

The ICL stake is top of the list for the NEB's "Sale of the Century", since the shares are easily marketable and several institutions are keen to get more.

The shares have stood up well on a weakening stock market and are tipped to go higher once the sale is out of the way.

ICL management will be delighted at the sale, since chairman Tom Hudson has consistently argued for wider ownership of the company.

The National Enterprise Board inherited the ICL stake from the Department of Industry and has not involved itself in running the company. Its only subsequent move was to

● Turn to back page

Briefing

Cut in govt grants

ICL says that following the government's announcement of dramatic cuts in regional development grants it is in touch with the relevant ministries to see if there will be any effect on ICL's finances.

Unlike IBM, ICL claims grants on rental kit that it installs in development areas. This has been a cause of some discontent in the past among ICL customers in these areas.

Changes at the top

THE ITT board of directors has replaced the company's chief executive, Lyman Hamilton, and the president of ITT Europe, Gerhard Andlinger, because of policy disagreements, understood to have included plans of Hamilton and Andlinger to sell ITT's controlling interests in its European consumer electronics operations. The new chief executive is Rand Araskog and the new ITT Europe president is John Guilfoyle. Both are ITT men.

1,300 jobs

AN investment of £45 million together with £14 million in government aid is to be made over the next five years by National Semiconductor in expanding its plant at Greenock, Scotland. The investment will more than double National's existing capacity in Scotland and provide about 1,300 new jobs. This will make it the company's second largest factory in the world.

UK launch

THE Olivetti automatic teller terminal, which has been available on the Continent since 1976, is to be introduced into the UK shortly. Called the TC800 ATS, the product is part-British already, as the cash dispensing mechanism comes from De la Rue (CW, October 14, 1976).

Overseas deals

ALTHOUGH the government's relaxation of foreign exchange controls on investment abroad will simplify the financing of overseas deals, it is unlikely to lead to a surge of new acquisitions of US or European companies in the computer and electronics sector. Companies like GEC, Racal and ICL, which are keen to make acquisitions, say that the main problem is not raising the necessary foreign exchange but finding suitable companies to buy.

Bid for Microdata

FOLLOWING "substantial agreement" between the two companies, McDonnell Douglas has launched a $73 million takeover bid for Microdata Corp, the California-based minimaker.

Laser printer

UNIVAC has become the fourth major mainframe company after Fujitsu, ICL and Itel to adopt the Siemens ND-2 laser printer for use with its products.

VOLKSWAGEN CASH OPENS NEW MARKETS

TA hits the takeover trail

by Tim Palmer

WITH an enormous cash injection from new majority shareholder Volkswagen, Triumph-Adler of Nuremburg is preparing a thrust on a broad front into the lower end of the general purpose business computer market and is on the look-out for acquisitions in the US and Europe.

As well as subscribing DM 34.5 million, £8.5 million, for new shares, Volkswagen is putting up DM 240 million, £60 million, for investment in new products and for acquisitions. The money is available in the current financial year and is equivalent to TA's research and development budget for the whole of the past 10 years.

Volkswagen's ambition is to double the consolidated turnover of the TA group from last year's DM 1,100 million in three years.

Spearhead of TA's plans to move up-market is a new processor built around the Texas Instruments TMS 9900 16-bit microprocessor. The attraction of this device is that nearly all the system software developed for the TI 990 minicomputer is available for it.

The first machine to use the new processor is the TA 1630, a small business computer designed for distributed processing. Main memory starts at 64K words, expandable to one Megaword, and the 1630 is currently offered with up to four display stations, which use the yellow-on-brown screen colour scheme which has been proved to be the least taxing on the eyes of the user. Programming is in Cobol, and the machine is likely to be launched in the UK next year.

The 1630 is backed with hard discs, but a smaller, floppy-disc-backed machine for stand-alone business applications, the TA1620, is to be added to the line.

Triumph-Adler scored a notable coup some three years ago with a DM 200 million order from the state railway system, Deutsche Bundesbahn, for 5,500 terminals.

In part, as a result of this success, the company is now planning a major foray into several specialist terminal markets. A point-of-sale terminal, the TA 35, which can also be used as a stand-alone electronic cash register, has been developed, and the next step will be to introduce terminals for the banking and building society markets.

Basic products already in the catalogue include a 250 cps matrix printer which is available with all the common interfaces

● Turn to back page

Appeal against the judge

WHEN the federal government's anti-trust suit resumed in New York last Thursday, IBM made its expected appeal — but instead of simply appealing against Judge Edelstein's latest ruling, the company appealed against the judge himself on the grounds that it would be deprived of a fair trial through prejudice. Judge Edelstein has been hearing the case without a jury for four years.

Meanwhile in San Francisco, the jury in the Transamerica Corp's anti-trust case against IBM cannot reach a decision, and the case will now be decided by a federal judge.

Plessey jobs saved

THE jobs of 37 Plessey Telecommunications employees in Liverpool have been saved under an agreement between the company and the staff union APEX on the introduction of new technology.

The workers were to be made redundant following the installation of new computer equipment later this year, but they will now be retrained and redeployed within the company.

"It is a significant part of the agreement that no job holder or existing job description will be downgraded as a result of new technology," said an APEX spokesman. "The new technology will now enhance the value of each job".

Additional clauses are that no work will go to outside agencies without prior consultation, nor will the computer system be used as an employee measuring device.

As it has already gained similar ground with NEI Parsons, and Mitchell Bearings, part of the Vickers Group, APEX sees this latest agreement as a possible foundation for national negotiations with other companies.

In August, a CMC Microdata Reality system with 17 VDUs will be installed to handle a variety of applications. These include engineering, contract and production control, stores, goods inwards, and financial work. The Reality system will be linked initially to an ICL 1904 but this is likely to be replaced by an ICL 2905 at the end of the year. There is also scope to increase the number of VDUs to 32.

Wim Hoeksma killed in crash

WIM HOEKSMA, formerly with Scicon and Dataskil and latterly publisher of Practical Computing magazine, was killed in a car accident early last Thursday morning in West London.

Hoeksma was alone in the car and no other vehicle was involved.

Hoeksma, 39, had been general marketing manager of the computer services company Scicon. He left after eight years to join ICL's software house subsidiary Dataskil as international marketing manager. From there he moved to Practical Computing.

He leaves a widow and two sons.

Itel drops NatSemi models

ITEL's agreement with National Semiconductor for all IBM-compatible processors apart from the AS/5-7031 will be terminated once existing purchase orders have been completed and National Semiconductor has started selling a machine similar to the AS/3-5 to end users in the US.

Known as the 8500, the new machine is being sold in five US cities and National Semiconductor plans to offer it to users in Europe.

The moves mean that in Europe, Itel will be marketing the AS-7020 and 7030 from IPL Systems, to compete with the IBM 4341; the AS/5-7031 from National Semiconductor which competes with the 3031; and the AS/6-7032, AS/6-7033 and AS/8-7034 from Hitachi which spans the 3032 to way above the 3033.

In the US, where it has been particularly hard hit by the IBM 4300, Itel is effectively out of the plug-compatible business below the 3031.

Announcement of Itel's second quarter figures has been put off until mid-August, and Wall Street analysts are privately predicting that losses for the quarter may be $20 million.

Over 500 people have now left the company, both on the DP and transport leasing sides. Itel has also scrapped its plans to develop its own processor.

DHSS order

OLIVETTI is supplying over 500 of its TC480 printer terminals to the Department of Health and Social Security for installation in DHSS offices all over the UK.

INSIDE THIS WEEK'S CW

WATCH OUT, IBM

Last week we reported exclusively Magnuson's move into the UK with its IBM-compatible mainframes. This week we talk to the company about its plans for expansion into Europe. Page 11

PREPARE FOR TOMORROW

We must prepare for the information society or face the prospect of massive unemployment. This view was expressed at last week's Education for the Future conference. Rory Johnston was there. Page 15

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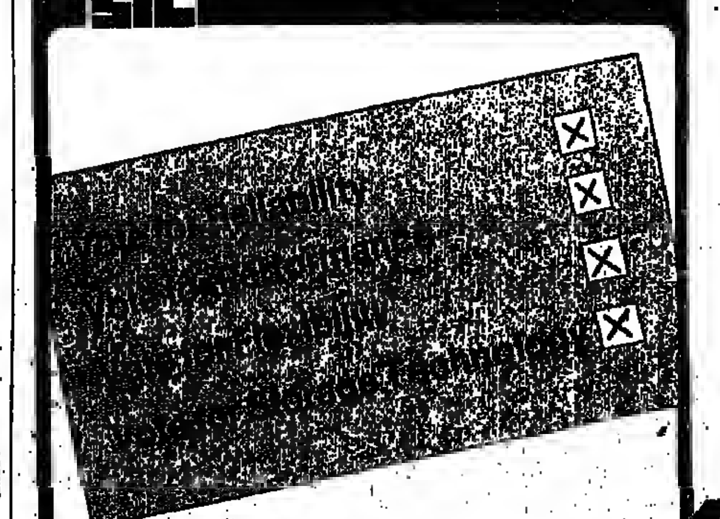

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COMPUTERVIEW

NEB sell-off offers exciting future at ICL

WHATEVER the rights and wrongs, as far as the national economy is concerned, of the National Enterprise Board's plan to sell its interests in certain companies, from the point of view of those companies the plan opens the way to a potentially exciting future.

ICL and Ferranti are likely to be among the star attractions in the NEB's great sale. And this potentially exciting future applies especially to them.

For at last the lame duck image will be killed off completely. ICL in particular has long outgrown this image with its impressive growth from £288 million to £510 million in two years, a growth matched by equally impressive increases in profits to £37.5 million. And Ferranti, which struggled even more than ICL in the early Seventies, is now standing on its own feet with a 25% increase in sales last year to £125 million and a 50% increase in profit to £9 million.

Despite these figures and the NEB's enterprising moves into the money-spinning software and office automation markets through Insac and Nexos, the Board still tends to be regarded as a home for lame ducks. ICL and other firms therefore still get lumped together with the likes of British Leyland and Rolls-Royce, because even though they are healthy enough now, they have had their turn as lame ducks.

The removal of all lame duck connotations can only be good for the companies concerned from the points of view of marketing and staff morale.

ICL is especially well placed to take advantage of its new-found freedom from the NEB. Over the last three or four years it has rationalised its operations so successfully that the number of staff has stayed fairly static, while sales and profit have grown dramatically. Its takeover of the international computer operations of Singer Business Machines had eyebrows raised admiringly on the international computer scene. And its move from under the shelter of a government shareholding could push it even further into the international limelight.

Other European computer companies depend on subsidies. Philips and Siemens are believed roughly to break even on their computer activities. The French government has a big stake in CII-HB. ICL will soon be able to make the most of this in marketing terms. And it will rank as a true equal to the likes of Honeywell, Univac and Burroughs, at least in terms of ownership.

In some respects ICL and Ferranti will be getting things both ways. For the NEB is keeping its role of supporting high technology. This could mean that public money could be called on if necessary to support new product development by ICL, Ferranti and other companies (it also virtually ensures that the microelectronics venture Inmos will stay in NEB hands — at least until the company reports later this year on how it has spent its first grant of £25 million and what it will do with the second £25 million).

All this, of course, assumes first that the NEB sells its shares in ICL and Ferranti — and this seems the easiest way for it to find most of the £100 million demanded by the government — and secondly that customers are found for the shares.

Taking the second point, there seems little problem. Stockbroking firms have been knocking on the NEB's door virtually since the election and one of them at least has a scheme for selling the government's £30 million 25% share in ICL to its institutional clients. The state of ICL's shares and the fact that they have risen from double figures to around 450p in relatively few years, with most of the increase coming in the last 18 months, should ensure a quick sale, further boosting ICL's image and morale.

Ferranti's slower profit growth, plus the fact that the government's holding in the company is as high as 50%, could see lower demand for shares. But a vote of confidence in the form of a £25 million loan from a consortium of banks 18 months ago perhaps indicates that there should be little problem in placing its shares.

A possible problem for ICL is that, although it has shaken off the lame duck image, it is still under the shadow of the failure of its 2900 series to fulfil all the company's promises.

The NEB's shareholding sale will give ICL respectability in the stock market. It is now up to the company to get respect in the computer market.

FOCUS

The big grow bigger

THE widely held view that DP managers are in the forefront of technological pioneering is often far from reality.

Few DPMs venture their reputations or their company's cash on untried or untested enterprises. Pace-setting is likely to be steady, with paces being settled one at a time.

This cautious factor is well featured in the latest Datamation listing of the Top 50 US companies in the DP industry.

The big, well-established companies are getting bigger while many of the smaller companies, if not exactly struggling for survival, are finding the climb to the top almost impossible to begin.

IBM naturally heads the chart with nearly 50% of the total DP industry sales. Even at number seven, Honeywell enjoys almost double the revenues of the next in line.

The adage, "If you can't beat them, join them" is ably demonstrated in the league placings. IBM plug-compatibles such as Itel, Amdahl and Storage Technology are well up with the top 15 leaders.

In fact, all three companies scored impressive gains in the annual growth charts. IBM may well lead the field but many in this particular field are IBM' satellites.

By 1982, it is anticipated that IBM and related PCM systems will have increased their share of the world market to 70%, leaving the balance to be collected by the Honeywells, Univacs and NCRs.

If incorporated into the Datamation chart, ICL would probably score a lowly eighth place, well behind the US industry leaders.

Given such vital industry statistics, it is hardly surprising that the DPM is loath to experiment. Job protection schemes extend beyond that of his own position in his company.

The marketplace for DP jobs concentrates on proven and well-established equipment and systems.

Advertisements seldom feature such requirements as an ability to manage mixed configurations or a proven track record in implementing Japanese mainframes.

Track records are more likely to demand several laps around IBM or ICL systems, together with a sound knowledge of all likely hurdles to be encountered.

Similarly employers will require considerable reassurances before being swayed into purchasing the latest technology — whether from California or Hatfield.

These basic facts of life soon become a way of life for DP teams. Only tried, tested and proven systems will be considered, and even then guarantees will be required.

This attitude extends beyond the realms of mainframe hardware. Stationery companies may come and go, printer ribbon salesmen are noted for disappearing up their own spools, media salesmen may well shatter delivery promises while small bureaux and system houses are often so busy seeking new business that they neglect their existing contracts.

In such cases, bigness is an insurance policy for DP management.

Bigness may well be good for the installation, but not necessarily so for the industry. It has taken Prime Computers, for example, several years to break into the coveted Top 50 league.

Prime and Wang apart, there is, as yet, slender evidence of the micro/mini challenge in the charts. Even the massed assaults of Apples and Pets have yet to penetrate the listings.

Meanwhile, DP management would probably welcome a new style of chart presentation, one not so much displaying size and balance sheets, but integrity and dependability.

Such factors as cost/performance would be taken into consideration as well as delivery times.

Top marks would be awarded to the organisation giving as much attention to service back-up as to sales, and not least the salesmen entertainment allowances. After all, all charts should be practical.

1984 and all that...

CONTRIBUTIONS from readers are welcome for our column on the strange things people say in the Press or on radio or TV about computers. We will pay £5 for each item we print.

DON'T LAUGH YET — THE NET MAY PULL YOU IN!

Most people are like me. They don't like the idea of computers storing away information about themselves.
But I warn you, it is going to get worse. Later this summer something called Euronet will be set up. It is enough to make me bite my toenails in fear.
It sounds very clever. Euronet is a network of computers, for computers (still with me?).
Sponsored by the EEC, it will supply industry with all sorts of "vital" information. When users dial the number of their local Euronet connection the London centre will make sure the caller is connected to the computer and database they require.
That is as much as I understand. But the thought of all those industrial, medical and (I hope it never comes to this) personal details zipping between computers in different countries makes me remember the old threat of a Big Brother.
Planet of the Apes would be preferable to being lorded over by a giant network of clicking machines.

Cathy Couzens in the Daily Star

Ten years ago...

COMPUTER WEEKLY JULY 24, 1969

THE Gels GE 600 series of number-crunchers was available in the UK, three years after its introduction to the US market . . . A group called Computer Professionals against the ASM was formed in the US — a computer error in the anti-ballistic missile system could start the Third World War, they said . . . There were rumours that IBM was to phase out the 360/30, 40, 50 and 67. . . The number of computers in Japan totalled 4,171 at the end of 1968 — mostly small capacity installations . . . In Kenya, the time taken for marking the Primary Certificate of Education exam papers was halved by reading the multiple-choice answer sheets into an ICL 1900 . . . The US government ordered a bulk memory system worth $4.1 million to be designed and built by Ampex using video tape recording techniques.

PO hand-over

THE last big new building the Post Office plans to build this century was handed over to Laing, the builders, this month.

Sited next to the Mermaid Theatre in London the building, called Baynard House after a Norman castle that once stood on the same site, will house reed-relay equipment now offloading traffic from Faraday House across the street and other City exchanges and allow them to replace their Strowger equipment.

Later Baynard House will house some of the first System X and junction exchanges as well as a Prestel computer centre.

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Tory axe over Labour's micros in schools plan

THE £12.5 million earmarked by the Labour government for investment in micro education in schools is one of the projects being reconsidered by Education Secretary Mark Carlisle in his review of government expenditure.

Sources close to the Department of Education and Science estimate that the project has a 50/50 chance of survival. The mere fact that it has not yet been cancelled is regarded as an optimistic sign in an environment in which the most likely cuts are being openly discussed.

The way in which Industry Minister Sir Keith Joseph made a special exemption for high technology in his plans for the NEB also indicates an awareness in the Cabinet of the need for special treatment for information technology.

On the other hand, the public expenditure cuts are likely to go so deep into all aspects of education that there could be resistance from teachers and parents if special priority was given to existing computing education at what might seem to be at the expense of teachers jobs and higher school meal prices.

Last weekend at the annual conference of MUSE, the Micro/mini Users in Secondary Education group, those teachers who have been most actively involved in bringing small computers into schools expressed strong concern not only that the DES micro project is in doubt, but that, even if it did survive, it could be inadequate to meet the explosive and enthusiastic demand from pupils for more education in the use of computers.

Birmingham schools inspector David Tinsley warned that there was already a loss of computer teaching expertise to more lucrative jobs in industry and that the love affair many pupils and teachers had found with microcomputers could quickly turn sour if there was inadequate technology support, particularly in the provision of good, reliable education programs.

The DES proposal was to spend £12.5 million over five years to be administered by a new agency (CW, March 15). At the time it was announced that many educationalists expressed strong fears that the money would be frittered away if it was used merely to put micros into schools without having a national framework of teacher support.

ICL look-alikes from Teknos

ICL users are now offered a totally compatible alternative to the 7903 front end processor by Teknos Systems of Uckfield, Sussex. Teknos can now also supply a complete range of remote terminals for 1900 users and will have a 7502 compatible terminal system for 2900 series users by the end of the year.

In addition, Teknos has started development of a data entry system involving local or remote terminals linked to a big disc store. The disc will be front ended by a minicomputer that will carry out data validation and terminal handling and which will also act like an EDS controller, linking the disc to the host CPU via a 512 characters per second DMA channel. In this way disc copies will be much faster than data transfer via the 7903, which is limited to 9600 bps.

According to Teknos, the data entry system will be similar in concept to the method used by IBM 3740 terminals. As well as being able to disc copy at 512K cbps it will also provide high speed offline printing of data that has been collected.

The data entry system will be a development of the EDS compatible disc subsystem that Teknos introduced several years ago. Sales of the system in the UK never got off the ground, due to ICL's policy of insisting that a user should have at least one ICL disc subsystem while charging considerably less for additional systems. In this way Teknos lost its competitive edge and as a result it has complained to the Office of Fair Trading and the EEC about the policy (CW, July 19).

With the data entry system, Teknos will be able to offer a lot more than just an EDS look-alike so that price comparisons will be less important.

In Poland there are eight EDS compatible Teknos disc subsystems running with 1900 compatible Odra mainframes.

The 7903 compatible system was developed by Teknos in conjunction with minicomputer manufacturer Digico, and like most of Teknos' intelligent systems it is configured around a 16 bit Digico minicomputer. Teknos says that it uses Digico minis rather than kit from any of the big US mini-makers because the Digico machines are less expensive and more reliable.

Teknos says that its 7903 look-alike is "competitively priced" and can be delivered within 90 days.

'More information' call

THE government should press foreign companies operating in the UK to disclose much more information about the way they are running their businesses, particularly how they affect the balance of payments, according to guidelines laid down by the Organisation for Economic Co-operation and Development. That is the principal recommendation made by a sub-committee of the Neddy Computer Sector Working Party.

The OECD has compiled a wide range of other guidelines, such as one dealing with the way multinationals' employment policies can benefit or harm national economies, and compliance with these guidelines needs to be more closely monitored, the committee said. It noted considerable lack of enthusiasm for the guidelines among the companies it interviewed.

Information on transfer prices — the prices the separate divisions of a firm charge each other for part-finished goods imported and exported — is of special concern to the committee, as it affects the balance of payments.

In its other recommendations, the committee asked for further efforts to persuade foreign companies to buy British components rather than import; the setting up of alliances between UK firms and US or Japanese ones; and more steps to overcome the shortage of skilled computer manpower.

As part of its work the committee tried to set up a database on the activities of foreign companies, but failed through the refusal by or inability of these firms to supply the appropriate information.

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Special trips to Sicob and Systems exhibitions

COMPUTER WEEKLY is arranging special trips to the Sicob exhibition and conference in Paris from September 18-21 and to Systems in Munich from September 17-21.

The Paris trip costs £138 for two nights. Visitors to Systems can have three nights for £185 or five nights for £230.

The prices include scheduled flights from Heathrow and a shared twin room in a top-class hotel. Single rooms are available for supplements of £15 a night in Munich and £15 for the two nights in Paris.

For further details and bookings contact Commercial Trade Travel, Carlisle House, 8 Southampton Row, London WC1. Telephone 01-405 8888/5469.

Bubble memory 'first'

THE first commercial product incorporating Plessey bubble memory devices is now being marketed by the company in the UK and overseas. Called Immediate Billing System it is a portable microcomputer complete with keyboard, display and thermal printer and its experimental use by the South of Scotland Electricity Board was first described in Computer Weekly earlier this year (CW, April 26).

The system comes with 64K bytes of bubble storage made up of eight 64K bit Plessey devices. They provide a back-up store with a much faster access time than magnetic tape cassette and are used by the board to hold names, addresses, previous meter readings and special messages.

The Plessey system is believed to be only the second commercial DP product to come with bubble memory. The first was the Texas Instruments 765 portable printer terminal (CW, November 23, 1978).

Linotype takeover

LINOTYPE, the typesetting equipment group, has been taken over by Allied Chemicals of New Jersey, as part of a £283 million purchase of its parent company Eltra, a giant US conglomerate.

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Downtime

by Chad

More matter with less art......

IT isn't just the technical side of computing that baffles outsiders. Our business seems to have developed a politics all of its own that seems quite inappropriate to the mundane nature of the subject — at least in the view of Douglas Ginsburg, a lecturer at Harvard Law School.

Ginsburg has written to the Wall Street Journal pointing out the ironic juxtaposition of two stories, one about the value of art as an investment and the other about the fracas over IBM's lottery for 4300 machines (CW, July 12). He was puzzled that art should be bought and sold according to the principles of supply and demand while computers were not.

Why, asked Ginsburg, should there be a streightforward marketplece approach to art, which moves men's souls, and something else to ellocete the computere that move their transactions? Why does not IBM sell 4300s according to the price system, simply by letting the price rise until fewer people want them?

He goes on to ask, "is it that IBM, end presumably other enterprises of its stature in the market, are now forced, by political reelities, to act as political beasts rather than profit maximisers? If so, why?"

Certainly the politics of IBM-beiting in the US I find totally mind-boggling, what with one group trying to force Big Blue to disclose its plans (to help the competition anticipete them) and another group trying to force IBM to keep everything secret (so as not to attract the other firms' customers).

However, it is funny that it did not occur to Ginsburg that IBM is in fact maximising its profits long-term with the ballot, by hanging on to its customers. It seems that Life is beginning to imitate Art.

Look here upon this picture

IN the computer Press we have a continuing problem in trying to find interesting pictures to brighten up the paper. After all, one computer looks very much like another, and as time goes by their outside appearances seem to get more and more boring. The IBM 4300 looks like nothing so much as an electric storage heeter.

We eschew printing endless photos of the same concrete and glass building taken from different angles. But nevertheless we are not helped in our efforts by many of the pictures that are sent to us. I think the one shown here wins the prize for the Most Boring Photograph of the Year so far. I would not be surprised if another one surpasses it before 1979 is out.

I suspect the photographer is a student of the recently-fashionable school of Minimal Art — black squares on derk brown canvases and so forth. The less information there is in a picture, the better. Mind you, there are limits. A screenplay writer of my acquaintance once wrote a shot into a (black end white) film script: "Pan to a cloudless sky." On reading it over, he thought better of that one!

Coinage of a brain

HERE'S something to reflect on the next time you get worried about humans being takan over by machines. A friend who still braves the vagaries of London Transport (ecologically-minded Chad has just started coming to work on a bicycle — smirk) reports seeing the following sign at St James's Park Underground station:

London Transport regrets that the automatic ticket machines are not working owing to staff shortage.

Expert systems pose a new sort of problem

By Robin Webster

Multi-role expert systems could revolutionise the teaching profession by providing a far more individualised service to the student. But the problems to surmount are great and the vast spectrum of human potentialities remains one of the greatest. To discuss the advances and remaining dilemmas a conference on expert systems was held at Edinburgh University earlier this month. ROBIN WEBSTER reports.

WHEN the noted mathematician Alan Turing pondered the controversial question "Can a machine think?" he discovered that it held too many ill-defined dimensions.

So instead of tackling it in the conventional style of his time, he raised the supplementary question: "Do we actually know what we mean when we use words like 'think' or 'intelligence', are we actually sure of our definitions?"

A similar inquiry can be made in terms of education by asking "Can a machine teach?"

Like the first question, the above needs refinement, and so we must see whether our understanding of what it is "to teach" is sufficient. In the absence of any undisputed theory of teaching it seems that we do not. And while various teaching models have been constructed and tested, it appears that we are a long way off from a generalised teaching computer.

Indications of where we stand with regard to progress in this area were to be found at Edinburgh University earlier this month, when the Society for Artificial Intelligence and Simulation of Behaviour held a conference on Expert Systems (CW, July 19).

An expert system, as described by Donald Michie of Edinburgh University, is essentially a "computing system which embodies organised knowledge concerning some specific area of human expertise . . . sufficient for it to be able to do duty as a skilful and cost-effective consultant".

It has three modes of operation. One is when it supplies a user or client with answers to problems; another is when the user enhances or increases the system's knowledge by acting as a tutor; and finally, when the expert system is used in teaching mode, making use of its accumulated data.

At the conference, Michie gave an example of how expert systems could provide more intuitive teaching in the future. It was found that when a particular chess end-game program was back-translated into readable English paragraphs it proved to be of more help to the amateur than a text written by a chess master.

"The reason for this appeared to be that the master tends to write for a player who already has some concept of the move he is being asked to do," explained Michie, "whereas the back-translation proved to be a good crib for the learner because it gave a more complete picture of the procedure."

One factor that must be introduced into future systems, added Michie, is that of a "human window" so that the computer's inner workings can be considered.

Between the two extremes of a system which does a lot of computing and has a small amount of memory, and another which does little computing but has a large memory, Michie showed that there was a "window" where system operations become human-intelligible and human-executable.

He told the following anecdote as an example of why it would be necessary to have this.

Two chess masters were to pit their combined expertise against a solo computer program. They had a King and Queen while the computer controlled only a King and Rook. Play began and it was only a short way into the match when the computer did something very unexpected — it separated its Rook from the King; a move expert players would deem incorrect and possibly fatal.

The psychological effect on the two human players was impressive. They played on vainly for another 30 minutes before deciding to retire from the game.

"Afterwards they were asked what they had felt when the computer made the unusual move," said Michie, "and they replied that it seemed counter-intuitive . . . hostile, almost alien . . . and, in fact, downright suicidal."

In this case, the computer program used a viable but unconventional tactic to confuse its opponents; but transfer the sequence of events to an air traffic control centre, and the image is much more complex.

What would happen if an air traffic controller, for example, observed a computer taking a very unusual action? Should he override the move, or reason that the system was handling the situation in an outrageous but correct manner? Indeed, without Michie's "human window" would he actually be able to comprehend the logic employed by the computer before the point where an irreversible error was about to be made, and so make a competent attempt to correct it?

"We have to be careful of representations that are possibly dangerous and which are brought about purely by the demands of machine optimisation," cautioned Michie.

Commenting on the need for a human window, Tim O'Shea, a lecturer in education techniques at the Open University, said that it would be very elusive.

"It seems to me unlikely that we will attain such a factor for at least another couple of decades," he said. "Nor will we see generalised computer assisted instruction systems that soon. There will probably be many systems, each of use to a specialist group."

O'Shea classed computer scientists among those who would benefit, but the thrust of what he outlined during the conference was that the nature of human nature is extremely difficult to assess.

"In developing a system at the University of Texas to teach students quadratic equations we found this to be the major stumbling block," he said. "We could indeed teach them the procedures involved, but as students they were far too variable in terms of performance.

"Also, there was another factor in the situation. I programmed the system to gather information from the students as they used it, so that in a sense it learned more and more automatically. This did give rise to a 'look, no hands' mentality, however, as I left it to do everything itself."

A successful system which was discussed was Sophie, which uses a peculiar semantic grammar that it only deals with electronic power system trouble-shooting.

Developed at a research centre in Boston with US Army and Navy funding it sets a theoretical power system complete with special units and circuits that can be made to malfunction. The user has to trace and repair the fault by careful interactive questioning.

"If the student is consistently inaccurate, Sophie demonstrates the reasoning behind the attempts," said O'Shea.

This is achieved by the programme interrupting the student until it is satisfied.

On the topic of questions necessary for a computer to know if the particular robot has of its environment is correct one before it can deal with that environment. An example of this is the robot system that is given the task of picking up, say, a wooden block as opposed to a red block that lies nearby. Concepts such as "red", "green", "nearby" have to be mathematically structured in the database. It must be told of its history too — its place and status in a given environment at a particular time, in relation to other pieces and states it has been in in the past.

If such steps are not taken, the attempt has hidden flaws, then this can lead to all sorts of trouble.

There is the tale of a Stanford University robot that had not been programmed with an awareness of its own structure and set about destroying itself in the room it occupied.

Or as Dr Pat Hayes, of Essex University, reported at the conference, there was a Californian robot that insisted on believing that there will be copies of itself in Rome because of inconsistencies in its world vision.

Both Hayes, and keynote speaker John McCarthy of Stanford University are trying to overcome this "frame problem" and other aspects of machine logic.

COURSE

EUROMICRO, the European Association for microprocessing and microprogramming, is organising its sixth annual symposium, called Euromicro 80. This will be held in London, and workers in the fields of microprocessing and microprogramming are expected to exchange ideas on the latest developments. The programme will consist of three sessions: scientific, industrial and short notes sessions, allowing brief, up-to-date presentation of results and applications. The conference will take place from September 16-18, and those wishing to submit papers should send an abstract before May 1, 1980 to: Programme Chairman, Prof Giovanni Sami, Istituto di Elettronica, Politecnico, Piazza L. Da Vinci, I-20133 Milano, Italy.

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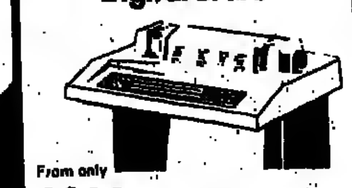
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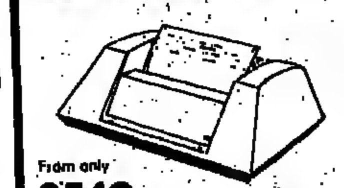
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International Federation of Information Providers mooted

VIEWDATA and videotex information providers should promote standards that lead to compatibility between systems, encourage the unrestricted flow of electronic information between countries and stimulate the growth of cheap, easy-to-use systems.

This was agreed by 13 interested parties who met in Zurich this month to propose an International Federation of Information Providers' Associations. They included three members of AVIP, the Association of Viewdata Information Providers based in the UK, and members of equivalent organisations in Switzerland and Canada.

SVIPA, the Swiss Viewdata Information Providers' Association, was formed about four months ago by 40 firms that were interested in providing information for the pilot trial to be launched in October by the Swiss PTT. Participation in the trial is to be limited to 70 organisations, to suit the 16 port GEC 4070-based system. Association members so far include publishers, a department store and a hotel group, as well as Swissair, Nestle and Reuters.

The Canadian group is tentatively called the National Association of Videotex Service Providers, and field trials will begin later this year.

The word "service" in the title reflects the intention that information will not be the only service provided over videotex.

French and German delegates to the Zurich meeting were urged to form national IP groups, so that the international body could consist entirely of federated national associations.

The organisation is to be registered in Switzerland, but its next meeting is planned for London in the autumn. It is hoped to attract further countries where videotex is being developed, and to provide for the exchange of information between members and copyright protection of the contents of databases.

Graphics giant set up by triple merger

A FORMIDABLE computer graphics manufacturer with a complete range of graphics products should be fully established by the end of the year following the acquisition of Calcomp by Sanders Associates (CW, May 17).

Apart from the highly sophisticated graphics display systems of Sanders, and the display and pen plotter products of Calcomp, the new enterprise will also be manufacturing and selling the electrostatic printer/plotters built at the moment by the Instruments division of Gould Inc.

Calcomp has come to a definitive agreement with Gould to acquire its electrostatic products, and the deal has the full approval of Sanders.

It should be completed very shortly and, by next year, the manufacture of the Gould products will have been moved from Cleveland, Ohio, to Anaheim, California, the location of Calcomp's headquarters.

The Calcomp acquisition is consistent with its policy of concentrating on its graphics products business following the sale of its OEM disc drive manufacturing operation to Xerox (CW, November 9, 1978).

Calcomp's sales of graphics products were worth about \$50 million in its 1978 fiscal year.

The turnover of Sanders Associates in 1978 was \$150 million, although a large proportion of this sum came from military electronics and radar equipment.

On the DP side, Sanders builds a system called the Graphic 7. It also developed the 3250 graphics system for IBM.

Since it sold its Data Systems division to Harris (CW, February 17, 1977) Sanders has had no marketing operation in Europe.

Calcomp in Europe cannot say when it will be selling the Sanders systems over here but it already knows the Gould electrostatic product line very well.

A SATISFIED Itel customer is Peter Merrick, managing director of the Lowndes-Ajax data services organisation, the first UK firm to install an IBM compatible Itel AS/7031.

The 7031 more than matches the power of an IBM 3031, and Merrick said he was delighted with the outcome of the Lowndes-Ajax decision to install the Itel machine. It was installed and running within a week of L-A signing the contract with Itel.

The 7031 has replaced an IBM 370/155 and works alongside the bureau's 370/158 Attached Processor system. The Itel machine is being used as the main processor for L-A's interactive teleprocessing services, which include financial planning and personnel information services. The 7031 runs under MVS with TSO, the financial planning package, Simplan, and the interactive database software, System 2000.

US-based micro software wholesaler plans UK launch

THE quality and variety of business software available in the UK for micros could get a fair-sized boost from next month when Lifeboat launches its UK operation. Set up two years ago in New York City by expatriate Englishman Tony Gold, Lifeboat acts as a marketing, support and distribution operation for software to run under the CP/M floppy disc operating system on a wide variety of microcomputer systems.

UK director Mark Potts said that accounting packages had been produced for the UK market by a London micro software house called Graffcom.

But the bulk of the products come from the US, from software houses such as Digital Research, which produced CP/M, and Microsoft which has produced 4K, 8K and disc extended versions of Basic — regarded as industry standards, and said to be installed in 200,000 machines.

Products from five or six main suppliers are supplemented by material sent in unsolicited, which Lifeboat checks out and provides documentation for.

Prices start at £25 to £30 for simple text processing programs, although one or two editing routines sell separately for £6. In the middle range, a link loading Fortran compiler costs £225, and at the top end applications packages go up to £400.

Software interfaces have been developed to enable all the operating systems, languages and applications to run on about 50 different machines.

Lifeboat's London office is expected to open late next month at 32 Neal Street, WC1.

Jobs picked on firm's network

BROOK STREET employment bureau job counsellors are now using a computer system called Oscar to match job applicants with any one of up to 10,000 vacancies.

Buying time on Datasolve's Amdahl 470V/6 (CW, June 7), to support a network of Datapoint terminals, the agency has replaced the previous manual method of card index searching and is now using microfiche viewers and VDUs in branch offices.

Each applicant is interviewed in the normal manner and then shown the range of vacancies relevant to his experience.

Communication between offices has been improved, so that once selected, a vacancy can immediately be removed or "held" for further action. The job counsellor is also in a better position to give a clearer picture of the nature of the work, conditions attached to it, and the salary and geographical location

£5m fibre optics systems

THE far-sightedness of the Post Office has been praised by GEC Telecommunications, which is taking the lion's share of £5 million worth of contracts for fibre optics transmission systems to be installed over the next three years (CW, July 19).

GEC's £2.0 million contracts include a 140 Mbps laser-driven link between London and Reading, which will carry 1,920 voice channels over the 75 km route. Fifteen routes are planned in the London area, the Midlands and North Wales.

POWER NEEDS A HARNESS

The Harness

Minicomputers are now challenging mainframes for sheer performance. But computing power is of little use unless it can be easily applied to the problem in hand.

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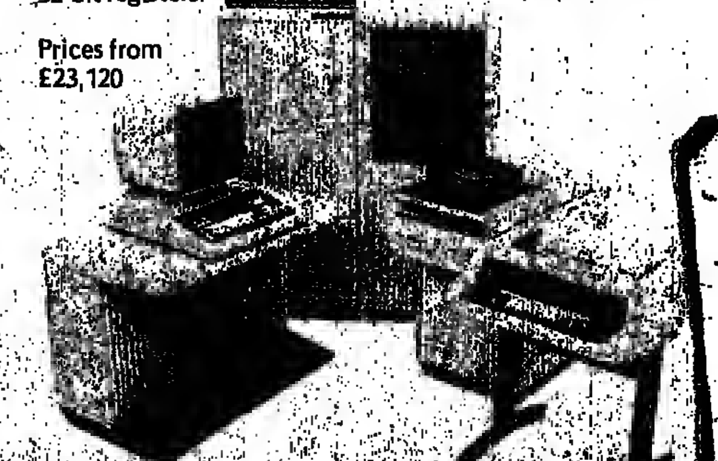

PERKIN-ELMER
Computer Systems Division
227 Bath Road Slough Berks Tel: Slough 34511

For further information contact Jane Berry on Slough (0753) 34511

GUEST PRIVATEVIEW

This Guest Privateview is by RODERICK REES, a systems support manager at ESAMS, where he heads a team working on maintainability, reliability and safety for the air defence variant of the Tornado interceptor aircraft. Rees is especially interested in the ways systems fail — even when they appear to be operating normally. This involves study of the man-machine interface.

New growth areas are too intellectual

OBSTACLES to "micro modernisation of the UK have been cited by Michie's Privateview including the difficulty of tempting people from places where new technology has made them redundant to fresh places where other new technology has created job opportunities. The list of difficulties could be extended.

In many areas of the country, a surprising proportion of men live in their wives' home area — "she wanted to be near her mother".

Clydeside shipbuilders wouldn't allow a shipyard to be moved a few miles along the coast because they would not move house nor commute a few miles extra. And we all know about the "new town blues".

In other words, the preservation of a community feeling — sometimes, but not always, most strongly expressed matrilineally — is of high value. But if unions agree standard wage rates for all working areas, there is no economic draw into the community unless other economic factors happen to go the same way.

Programmers' and engineers' pay rates are largely subject to supply and demand. Thus those who wish to work in relatively remote but pleasant areas, such as the West Country say, may accept lower rates than must be paid to attract people into London.

Tinkering with the working week or educational release will not change that. Mostly such things will, in any case, affect only those who do not suffer from unemployment anyway (how many Port of London dockers will want educational day-release?).

The whole situation is complicated by unpredictable and arbitrary matters of taste and fashion. Who could expect, for example, that the "microprocessor revolution" could, at so early a stage, seriously attempt for £139 to compete for the £1 pocket phrase-book market?

More than that, many of the traditional skill areas, particularly in engineering, included manual, holistic ways of thinking and operating that were valued by the workers.

The new growth areas like programming are too intellectual. Not many machine tool craftsmen, for example, will wish to, or be able to, convert to a purely intellectual skill. What is more, I believe they are right.

A community that is so heavily intellect-based must expect some sort of social or psychological problems from neglect of the non-intellectual capacities and failure to integrate them.

In the long run, I believe a community which is heavily intellect-based must, for its own health, deliberately seek to create growth areas which are based on non-intellectual activities or, better still, on thoroughly integrated areas.

This will be difficult. The enormous increase in the number of craft potters indicates the abstract pattern that is required, but they do not bring in enough money.

In the end, people look for meaning, and human meaning cannot be intellectually expressed.

I did once meet a computer engineer who, answering my challenge, claimed that he could write a program of instructions for how to make love to your wife — if so, then anyone should be able to use it. But I don't think he asked his wife's opinion!

A part of the problem over technological unemployment is people's bolshie reaction to having to work automatically; that is: being forced to behave like intellectual abstractions.

"Job enrichment" is a hesitant scratch at the surface. Encouraging the creation of small firms will help: the human interactions seem usually to be rewarding in themselves, no matter how dull or even unpleasant the tasks. In this sense indeed, "small is beautiful".

Perhaps a start which would be socially acceptable — its economic success could be no more than guessed at — is the encouragement of small firms, started and owned by local people including union members, encouraged and funded if possible by unions. Meriden did it backwards.

First you must identify people in, say, the shipbuilding community in Glasgow, who given a little, and only a little, help have enough go and enough of the community's trust, to make a company succeed.

It is hard to see much else that can succeed, except allowing outsiders to come in, so that we become the world's employees.

If the Americans are frightened of the Japanese and Japanese are frightened of the Koreans, what will happen to UK micro-electronics firms when the Koreans really get going?

So we must do it ourselves, and that means we must first devise "it" for us to do.

THE INTERFACE TO THE FUTURE
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SOFTWARE FILE-1

US to restrict sales of Datasecure to 'safe' installations

A CRYPTOGRAPHIC security system developed for ADR's databac management system Datacom/DB is being regarded by US State Department officials as too sensitive for uncontrolled marketing outside the US.

The system, Datasecure, was developed by ADR in conjunction with a company specialising in data encryption technology, Computation Planning Inc (Complan). It is scheduled for release in the US this year.

It looks unlikely, however, that the software will be marketed in Europe, as the State Department is reported to regard it as an instrument of war. It is therefore insisting that each installation be explicitly authorised.

Only the implementation is being protected, the algorithm it employs, DEA, having been published four years ago by the National Bureau of Standards as part of its data encryption standard.

DEA has been adopted such systems as the Fed network for the protecting interbank funds transfer sys been endorsed by the Nati Security Agency for applica to classified material.

It has also passed the v vote of the Ansi sectional m mittee X3 as the first Ameri National Standard on cry graphy.

ADR Datacom division the use of cryption as part "near absolute" protection information on removable media. It also argues that it intelligently applied, cryp less costly than older tech

As well as making use ised read access "econom unfeasible", cryption pre files against otherwise tected tampering, chan even a single bit, causing whole file to appear as bein

All other Datacom/DB Datacom/DC products are in this country by CAP (Software File, June 28).

Control of user access a feature of Oscar

CENTRALISED logging and recovery, control over user access, and a means to monitor system utilisation are the chief facilities provided by a new systems software package for use on minicomputers supporting multiple VDUs.

Called Oscar, Online Security Control and Applications Routing, the software was developed by GMS Computing, of Sheffield, and has so far been supplied to Inforex 7000 users.

It is written in Cobol and could be implemented on most minicomputer environments.

The main aim of the system is to control terminal usage. This is achieves via a system of passwords, restricting named terminals and users to specific applications, transaction types and files.

In addition, the software provides a standard logging and recovery mechanism and facilities for recording and analysing transactions processed.

Oscar works by mediating program calls to the operating system, sitting between the application and the operating system.

As a result, it imposes a small overhead on most file handling operations, slightly degrading the response time. GMS argues that this penalty must be traded-off against increased security and points out that considerable tuning is possible, given a suitable operating system architecture.

A further considerable significant savings are possible in the time of recovery where the after a crash, was to on, day's transactions after the previous night's.

Oscar is priced at £1,000, including and maintenance. On machine, it could cost more, depending on the characteristics of the Cobol or...

Engineering exhibition

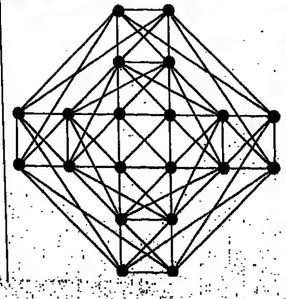
SOUTHAMPTON has been chosen as the venue for the First International Conference and Exhibition on Engineering Software, to be held from September 4 to 8.

Major engineering application fields to be covered include civil and structural, mechanical, environmental, transportation, electrical and electronic, and water resource engineering.

The concurrent exhibition will cover software products, services and equipment related to engineering software.

Further information is available from Dr R. A. Adey, ENGSOFT, 126 High Street, Southampton, SO1 0AA. Tel: 0703 21387.

Puzzler



THE diagram on the left shows how 20 points, arranged in the shape of a cross, "generate" 21 four-point squares of various sizes. This week's problem is to remove six of the points, in such a way as to "kill" all 21 squares by taking away at least one of the corners in each case. See page 33 for solution.

Pascal-like control structures allowed

AN APL preprocessor allows APL programmers Pascal-like control structures as well as other extensions, been produced by an A software house, Codewor Turin.

Called Aplomb, the pr cessor is written in APL s it can be run in any APL envir It expands its own resul standard APL, which is handled by the existing pr preter.

Codework says that it makes labels and boun redundant by offering — nestable — control st IF-THEN-ELSE, WHILE FOR-UPTO-DO, and REP END.

The basic price of Aplo in VSPC, APLSV and V versions is $5,000. A ver runs on the IBM 9/10 and PDP-11, requiring a mi workspace of 32K bytes.

Library for LMS

THE Chamshare Pro library, developed by share Process Systems optimisation of program design, has been installed London United Computer tems. It consists of two grams for processing Design/2000 and Telcon chitra, which interface physical property databases

SOFTWARE FILE-2

By Peter Hewitt

Altergo language slashes TP development time

AN online programming language has been launched by Altergo Software which is claimed to slash the complexity of traditional TP application development and make possible substantial savings in development time.

Called CPG, Communications Program Generator, it also makes TP programs independent of their environment, so that the operating system, TP monitor, or file organisation can be changed without requiring changes in the application code.

Altergo is currently marketing versions which support either CICS or Shadow II, under both DOS and OS. It expects to announce an MTCS version shortly.

As a language, CPG is most closely related to RPG II, sharing some of its syntax and using a similar fixed format representation. It offers in addition a large number of extensions specifically designed for online programming.

These include for example an integral screen mapping facility and tools for screen manipulation and data editing.

A key aim of CPG is to simplify the programmer's task, eliminating the need for specialist knowledge and training. This is reflected in user programs by the absence of TP monitor linkages, IOCS macros, and record structures.

Instead, such items are held externally to the program in two libraries the Central Routine Library, which holds linkages and access macros, and the File Table Generator, which defines file structures.

Should there be changes in the system software environment, or in file organisation, only the library entities need to be modified and not the program code.

Programs compiled by CPG are re-entrant and multi-tasking and are said to be highly optimised and compact. As a result, claims Altergo, CPU and paging overheads are lower than with conventional languages and response times correspondingly improved.

Altergo obtained marketing rights to CPG from the West German software house Renker which developed it and which will continue to carry ultimate technical responsibility.

Although the marketing agreement is worldwide, Renker has retained exclusive rights in the CICS version in West Germany, where it already has 80 users.

CPG costs £6,500 under DOS and £7,500 under OS.

● CPG addresses much the same user requirement as ICL Dataskil's Solve, currently under development for 2100s running under VME/B. (CW, March 2, 1978). Solve, now renamed by the company as Slave and likely to be launched early next year, differs however from CPG in being interpretative and using an English-like syntax.

Algol 68 is first SME step to bridging 1900-2900

THE introduction of a 2900 implementation of the RS Algol 68 compiler — predicted to accompany the next release of VME/B — will constitute the first tangible step taken by ICL towards realising the concept of the simulated machine environment, SME, the new set of 1900-2900 transition aids announced exclusively last week (CW, July 19).

RS Algol 68 is based on the RSRE's Algol 68 compiler (Software File, May 31) and has been widely used by systems programmers on 1900 machines for many years.

The availability of the language on the 2900 series thus constitutes one of the vital software bridges between the two systems envisaged by SME.

It was in fact one of the original requirements identified by W. D. & H. O. Wills, along with the need for a 1900 implementation of the Cobol C2 compiler and the ability to run VME/B SCL under George 3.

Components satisfying all three of these requirements now look likely to be available by the middle of next year, leaving just two further items on the original list outstanding.

The first of these is a compatible editor. Although the George 3 and VME/B editors are very similar, there are a number of irritating differences which users would like to see eliminated — such as the fact that starting point for the George editor is 0.0 while the VME/B editor labels the first character as 1.1.

ICL has not yet committed itself to bringing the two together but a spokesman thought that it would not be a major technical task and could well be within the scope of an experienced systems programmer at a user site.

The other remaining requirement is for a 1900 implementation of the data dictionary, which is seen as of potentially major assistance to forward planning.

The intention of SME as a whole is to allow real transition to 2900 to begin even before a 2900 has been installed. An important freedom it gives is the ability to tackle each conversion task independently, on a timescale fully under the control of the customer.

Without it, it is argued, conversion to 2900 is for some customers no more attractive than a move to any other hardware, especially when only a non-DME machine, such as a 2970 or above, would be sufficiently powerful to handle the existing 1900 workload.

Few manufacturers have in recent years posed users such substantial conversion problems on new range hardware, but SME — like its predecessor and converse DME — is seen as going a long way to removing the remaining obstacles.

Univac version of Quikjob

WESTINGHOUSE is to market a Univac version of the highly-regarded report generator and general utility Quikjob, previously available only on IBM equipment. It will run under the VMOS or VS/9 operating system on Univac Series 70 or Series 90 machines.

The new version was produced by System Support Software, the US developer of the original Quikjob package, and costs much the same as the IBM implementation. A permanent licence for Quikjob II costs £2,200 and, for Quikjob III, £3,750. An implementation of Quikwrite, which includes Quikjob III as a subset, will also be available.

IBM-oriented system software is only rarely converted for use on other mainframes, though the much larger Mark IV system is also available on Univac systems in addition to IBM and Siemens. The Univac Series 90 has also attracted the attention of the NCC, which last month launched a version of Filetab for it (Software File, June 21).

End-user facilities for online info on Prime

A PACKAGE giving end-users all the basic facilities needed to maintain online information systems on Prime minicomputers has been developed by LMR Computer Services, of Maidenhead.

Called Admin, it is being used on LMR's Prime 400 to provide an online bureau service. It is also available under licence for use on in-house Prime machines and LMR is talking to two further minicomputer manufacturers about implementing it on their systems.

Admin provides facilities in three areas: file maintenance, data retrieval and reporting. Notable features of the system include support for multiple file indexes and a degree of physical file independence, giving it some of the characteristics of a data-base management system.

The system is also notable for in effect handling free text, by catering for variable length records in which each item may occur any number of times and be of any length.

Users access Admin facilities via a set of simple commands issued via a VDU. New file entries, for example, may be set up using *Create*, subsequently being *Displayed*, *Edited*, or *Deleted*.

No file definition step is needed to set up a new file, as all the information required is taken from the screen input format. If new fields are added, the file will be redefined or extended automatically.

However, files are not tied to screen formats and any number of screen formats can be used to maintain a file.

For retrieval, the system offers a *Find* command which operates either on the prime index field or on one of up to 19 secondary indexes. A *Search* facility is also implemented, allowing a sub-file to be extracted following a sequential scan of the file.

The system also offers a utility for defining print formats and a data dictionary. All Admin facilities are protected by passwords, which operate at the system, file, or screen format level.

LMR sees Admin as more accessible to end-users than Prime's Power-Plus, pointing for example to the fact that no file definitions have to be prepared, and to the ability to process free text.

Admin is written in Fortran and requires a minimum working space of 64K. It is priced at £6,500.

The DP manager who wrote the lease on his 303X and then paid the price

He thought he was doing his company a favour. Take the 303X on a financial lease, write it off over the leasing period, and then remarket it himself at the residual value. Pretty smart.

Then IBM announce the 4300. Suddenly he's no longer sure what that residual value will be. It seems he's been paying through the nose for the last three years to no avail, because in the end he's not going to make a killing after all. Except perhaps in a rather unintended way.

It's high time he called in IBL. We specialise in the leasing, broking and trading of IBM mainframes and peripherals worldwide, and we can help him in a number of ways. For example, by converting his financial lease into an operating lease we can substantially reduce his outgoings and relieve him of all worries about his equipment's eventual worth.

This is clearly no time for users to gamble on future values. Ring David Scouse on Ascot (09001 22286. He'll take a load off your mind, and the financial director off your back.

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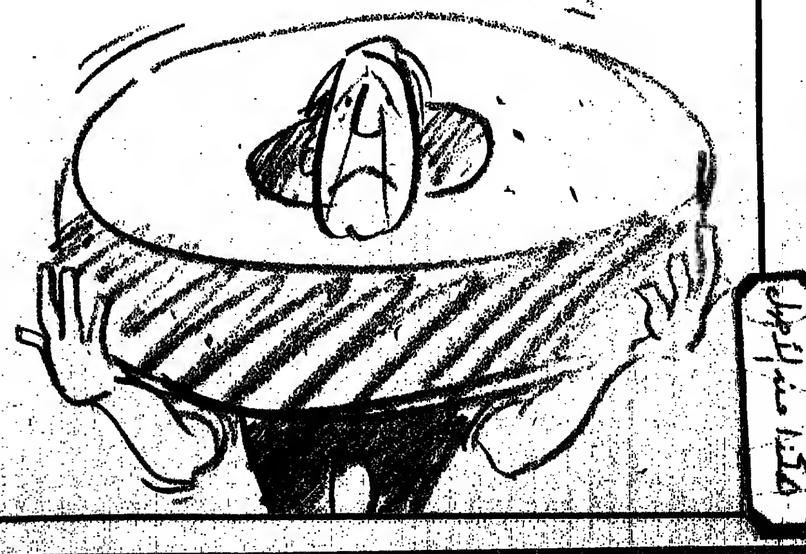

OP SPOT

By Bernard Allen

'This industry does not need trade unions'

OPERATIONS staff and union involvement is an iasue on which John O'Rcilly has strong feclings.

Chief operator at Astral Computer Services' London bureou, he first gave us a taste of his views some time ogo (Op Spot, Moy 24).

On that occasion he said, in effect, that if an operator is dissatisfied with his site, there is no need to look to unions for help — he merely has to find another installation.

For thoae comments he received a sharp rebuke from a number of union officials who said thot his advice amounted to advocating "job-hopping" (Op Spot, June 14).

Stung into action by that criticism, O'Reilly writes to Op Spot once again, pointing out that sites in the computer industry are crying out for staff. The economics of the situation puts the employee in a very strong position.

"I am not for one minute suggesting that 'job-hopping' is the solution to every problem. However, the freedom to move about is something which very few industries have to offer, and staff ahould take advantage of it to better themselves."

In his view, the fact that staff move about is beneficial not only to the individual but also to the industry as a whole:

"Wa have the opportunity to better ourselves from an educational and financial standpoint, not only by taking but by contributing positively to the development of other sites by passing on the knowledge we have gained."

He argues that individuals should earn what they are worth, and is critical of union bargaining:

"I am sure a lot of people would love oll rises to be 7%, or whatever, across the board. It would probably be negotiated by a shop steward or two who could not distinguish between someone who waa learning and contributing to the site, from another who wes asleep all day."

He defends management by emphasising that he has always been well treated by them: "Since I have been in the DP industry, I have always worked for companies which interview staff regularly to enaure that they are content and are progressing along the right lines. Some of them negotiate pay risea on an individual basis — if that'a not an incentive, what ia?"

He concedes that unions are necessary and have their usea, but is adamant that the computer industry does not need them.

"Let me state categorically that I realise under certain circumstances trade unions do a lot of good. However, this industry has a very good record for peace and ao let's keep it that way."

How one site kept cost of listing paper down

THE price of listing paper has risen by 20% in Belgium, but one site at least hes found o wov of keeping coats down.

Staff at Oow Corning, silicon product manufacturers in Bruosols, have aIded a pseudo-writor to thoir IBM 3031, which runs under the OS/VS1 operating system.

And operations manager Gerald Sogglano reckons that the pseudo-writer, or WRTZ es it la often called, will save the company some 500 listing pages per week.

He said: "We have RJE and IMS links to terminals in five European countries and each of them may alert and stop the readers perhaps three times a day.

"Before we put the pseudo-writer in, the readers would produce a listing with a header and trailer label each time they were stopped."

Auerbach report highlights need for software monitors

SYSTEMS are becoming more and more sophisticated with the emphasis shifting away from batch work and towards transaction-based applications. As a result of this, job accounting information and observation by the operator is no longer adequate for assessing system performance. Software monitors are necessary, according to a portfolio by Auerbach Publishers Inc.

Called Analysing the output of the software monitor, it is one of the July updates to Data Centre Operations Management, and relates to the merits of software monitors.

The author mentions thet software monitors are able to distinguiah between program activity and system overheads. This meana that they can be used as an aid in working out user charges.

In relation to the prediction of future work trends and assessing whether system modifications are required, they are useful because they produce consistent dato.

He points out that software monitors are easier to use than their hardware counterparts, the latter calling for considerable knowledge about both the system and applications on behalf of tha user.

Sites have the choice of buying a well-tested commercial monitor or developing their own in-house.

The fact that most operating systems produce accounting data means that commercial monitors have to be modified considerably on installation. They are, however, relatively cheap and have the advantage of support from the supplier.

Indeed, the author strongly advises sites not to develop their own software monitor because of the "degree of expertise required and the time and cost involved in such a venture."

File location and the mix of active jobs are extremely important in relation to system performance. And once location has been optimised, a monitor can be used to work out the best job mix.

According to the author, applications do not need tuning, and the manager should concern himself only with those involving a lot of processor activity.

* Data Centre Operations Management. £120, including bi-monthly updates. Available from Heyden & Sons Ltd, Spectrum House, Hillview Gardens, London NW4. Tel 01-203 5171.

More money, more quickly

OPERATORS at the Guardian Royol Exchange are to earn more money, more quickly, under a scheme to be introduced shortly by the company. Staff will reach the top salary level of their respective grades by five annual increments, as opposed to tha 12 undor the old scheme.

This is part of an agreement between the Guardian Royal Exchange and the Association of Scientific, Technical and Managerial Staffs, the union with bargaining rights for the operators.

Improved terms alao include a shift allowance of £850 a year for ataff at starting grade, with all others getting £1,000 per annum.

We want your opinions!

OPERATORS often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations.

Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London, SE1. Telephone calls are equally welcome and Bernard can be contacted direct on 01-261 8035.

HINT OF THE WEEK

Deleting unwanted O/P

DELETING unwanted output in the Univac OS 1100 environment is the subject of a hint from Alan Winter, an operator at BP Oil, Hemel Hempstead.

Winter points out that certain file deletion jobs produce listings which are seldom read by anyone. This wastes both the operators' time and the company's money.

To avoid this, OS 1100 operators should make use of the delete option of the @SYM statement — a statement often used ordinarily to route listings to remote users.

He explains, "By placing @SYM,D PRINT$ as the last statement in the job, unwanted output is deleted by the system.

"As it is the last card in the run-stream, the statement will be ignored in the event of an error statement and a dump will still be produced by the system. This might be needed for diagnostics."

His site also has a routine which uses the @SYM PRINT$ statement to cater for jobs for which listings are needed by operators on some occasions but not on others.

He writes: "The routine causes a 'PRINT REQUIRED Y OR N' message to be output to the console. A reply of 'Y' causes the '@SYM,D PRINT$' statement to be processed by the system while a reply of 'N' causes it to skip the statement.

"This statement has enabled our site to save a considerable amount of listing paper over the past few years," he adds.

HAMILTON

For sale or rent.

TERMINALS	3 months	6 months	12 months	SALE
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LA36 DECwriter II	87	65	55	875
LS120 DECwriter III	135	99	85	1785
LA120 DECwriter III	160	115	95	1895
LA180 DECwriter I	129	96	80	1698
VT52 DECscope	86	64	54	[illegible]
VT100 VDU	98	70	59	1089
VT132 VDU	116	85	70	1299
TEXAS				
733 ASR	180	135	105	2250
743 KSR	88	66	54	1105
745 Portable Acoustic Coupler & EIA	120	93	74	1895
763 KSR 20K Bubble Memory	180	135	104	2195
765 Portable 20K Bubble Memory	210	160	119	2895
810A Printer	145	118	89	1650
820 KSR	170	120	100	1780
HAZELTINE				
1400 VDU	50	38	34	850
1500 VDU	72	54	45	[illegible]
1510 VDU	00	58	50	[illegible]
1520 VDU	90	70	59	[illegible]
TECHTRAN				
950 Floppy Disc Unit	85	65	55	[illegible]
951 Floppy Disc Unit	105	75	65	[illegible]
8421 Dual Cassette	136	102	87	[illegible]
815 Single Cassette	58	44	37	[illegible]
MIDLECTRON				
M22 Reader/Punch Unit	84	63	52	[illegible]
DIABLO				
1620 Hyterm	186	140	117	[illegible]
1641 Hyterm ASCII/IBM 2741	216	182	135	[illegible]
LEAR SIEGLER				
ADM 3A VDU	54	40	36	[illegible]
TELETYPE				
Model 43 Printer	95	72	80	[illegible]
HEWLETT PACKARD				
2621A VDU	85	65	55	[illegible]
2621P With Printer	148	112	95	[illegible]
2635A	196	147	123	[illegible]
2641 APL/ASCII	240	180	150	[illegible]
2645A	208	156	130	[illegible]
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GRAPHICS DISPLAY TERMINALS	3 months	6 months	12 months	SALE
TEKTRONIX				
4006-1	200	150	131	[illegible]
4010-1	323	243	212	[illegible]
4012	424	317	277	[illegible]
4013 ASCII/APL	457	342	300	[illegible]
4014-1	760	571	523	[illegible]
4015-1 ASCII/APL	829	622	567	[illegible]
4016-1	1311	945	790	[illegible]
4631 Hard Copy Unit	281	210	189	[illegible]
4662 X-Y Plotter	266	200	104	[illegible]
4663 Interactive Plotter	625	409	393	[illegible]
4954 Graphic Tablet	347	260	228	[illegible]
4027 Colour Graphics Terminal	561	420	352	[illegible]
4051 Graphic Computing System	389	292	257	[illegible]
DESK TOP COMPUTERS				
HEWLETT PACKARD				
9815S	222	159	140	[illegible]
9825A	320	230	210	[illegible]
9830	450	290	240	[illegible]
9835A	525	395	360	[illegible]
9845S	1160	870	725	[illegible]
9862A X-Y Plotter	221	162	135	[illegible]
9866B Thermal Printer	216	162	135	[illegible]
9871A Printer/Plotter	240	100	150	[illegible]
9872A 4 Pen Printer/Plotter	288	216	180	[illegible]
9874A Digitiser	325	250	210	[illegible]
9875A Dual Tape Cartridge Drive	165	126	105	[illegible]
9876A Thermal Printer	188	148	126	[illegible]
9878A I/O Expander	68	51	43	[illegible]
9885M Flexible Disc Drive Master	221	165	139	[illegible]
7245 Thermal Plotter/Printer	260	195	160	[illegible]
MINI COMPUTERS				
DIGITAL				
PDP11/VO3	595	429	357	[illegible]
PDP11/TO3	1075	791	659	[illegible]
PDP11/34	1532	1149	1053	[illegible]
WORD PROCESSORS				
DIGITAL				
WD78 Dual Floppy Disc, VDU, Printer, Communications	750	575	475	[illegible]
WD212 Multi-Terminal, Shared Facility System			1122	[illegible]
TYPEWRITERS				
IBM 895	54	40	34	[illegible]
Sperry Remington SR101	52	38	32	[illegible]

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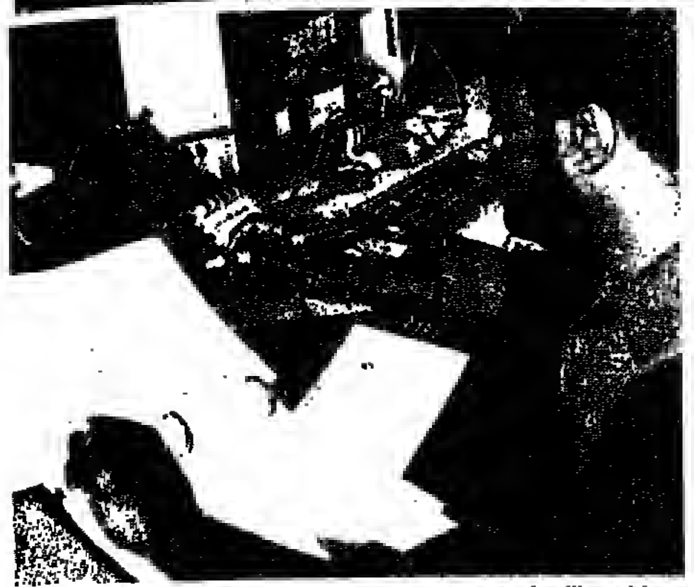
MICRO NEWS



At an ICS troubleshooting course, a student becomes familiar with an in-circuit emulation.

ICS teams with Poly for courses that give hands-on experience

AFTER five years of persistent "door-to-door" aelling of its microprocessor training courses by mail shot, Integrated Computer Systems has gained a roof over its head by teaming up with the Polytechnic of Central London.

Professor Derek Wilson of PCL explained that the college had responded to the last government's initiative to provide continuous education in microprocessors, and had picked ICS as a partner becausa it was established in the short course business, was good at marketing and had shown good administrative ability.

He added that he thought any US firm would have to stay up to date with its material if it was to maintain its financial viability in the fast changing US market.

The courses will be one to five days long, and will start in September in the building in Holborn which was vacated by the School of Law when it found larger premises for itself.

A feature of the courses is that they provide hands-on experience of microprocessor devices, which, ICS president Dr David Collins explained, gives a practical understanding of what is involved and overcomes student fear.

On one of the general micro courses, each student uses his own Intel 8080-based processor board with a hex keyboard and two kilobytes of RAM, and also an interface board with a counter-timer, interrupt logic, analogue to digital conversion and several serial and parallel input-output ports.

On tha troubleshooting course, four or five studants share test equipment which includes a logic analyser, an in-circuit emulator and logic and current probes.

The aim is to train engineera to use micros in designing products that will be competitive, and to close the "implementation gap" between high technology in research establishments and the shop floor.

David Else of the NCC said PCL and ICS were in at the beginning of o very large expansion in training for industrial students, with 11,000 more places expected in the UK as a whole in the next academic year. Training for maintenance and installation engineers was also important, he said.

The ICS scheme will add 1,000 places next year to the microprocessor applications and awareness coursea PCL is already running. The £60,000 of government funds will enable it to re-equip the Holborn building to set up the scheme, which is expected to become self-financing very quickly, turning over about £½ million a year. It will be a base for single-client courses, modified to suit a particular industry, like those ICS ran recently for the National Coal Board.

Seven courses are planned initially, including o manager-level overview of microprocessors, telecommunicationa applications, manufacturing and industrial control and military systems.

Micros are the basis of about a third of ICS courses, and others have been developed recently in fibre optics, radar, digital image processing and signal procassing.

Touch-sensitive keyboard

A TOUCH-SENSITIVE keyboard made by Star Devices of Newbury, Barks usea an unusual method of generating the 128-character Ascii set: it has 128 keys, one for aach coda; upper and lower case and control characters are all separate; and there is no shift key.

The price is £37.50, and the ranga of options from £2 to £8 includes various aerial interface arrangements as well aa the earphone and socket.

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Thermal printer for Trendcom

PERSONAL Computers, tha London-based Apple distributor, has started importing tha Trendcom 40 cps thermal printer from tha US and has sold the first 100 units to Apple and Pet usera.

Selling at £243, the Trendcom 100 printer usea a fiva by seven matrix and prints bi-directionally, 40 characters to a four-inch line.

10 years old

CHIP maker Mostek, which first produced tha Z80 for Zilog bafore Zilog was able to produce it itself, calabratad its tenth birthday lost month.

Set up in June 1969 to produce MOS/LSI, it shipped its first product the following yaar and has sinca grown to turn over $134 million last year. It hos 5,800 employeos worldwide, offices in seven European countries as well as in Japan, and a manufacturing plant in Malaysia.

NCC seeks data on micro software

A SURVEY of microprocessor software is to be carried out by the Notionol Computing Centre, in response to the large number of inquiries the centre has been receiving on this subject. There will be two parts, one covering high-level languages and the other applications packages, and the NCC is keen to receive information on these from both suppliers and users.

Questionnaires are being sent to 800 software suppliers to determine what products and support services they currently have availabla. Any supplier who has been overlooked, and any user wishing to contribute comments, should contact Lyndon Morgan at the NCC, Oxford Road, Manchester M1 7ED, telephone 061-228 6333.

The information being collected on programming languages includes their characteristics, the versiona available, their suitability for different applications, and how thay are being marketed. The support provided by suppliers for applications packages will be looked into in particular depth. The results of the surveys will be published.

The NCC has just published a paperback book by its Chief Editor of Publications, G. L. Simons, entitled Introducing Microprocessors. This gives a brief description of the principles behind micros, and goes on to list the specifications of most of the chips now on the market, and the software available for them.

Another chapter discusses what designers need to consider when incorporating micros into their products, mainly from the hardware point of view. The last two chapters describe a range of applications for micros, and touch briefly on the "social impact" side. There is an extensive bibliography the book costs £6.50.

'First home computer'

"THE world's first true home computer" is the claim Ohio Scientific has made for its C8P DF, launched at the Chicago Consumer Electronics Show.

The claim is based on the number of add-ons and interfoces provided for entertainment and external control by the $2,600 systam. They include a real time clock for use in monitoring and controlling home devices while the system is in use as a personal computer, an AC interface for remote control of appliances plugged into the mains, and a universol telephone interface to dial numbers, anawer calls, send and receive modulated data or multifrequency "touch tones", or even output a plain language message through a voice synthesiser.

The system is based on the Ohio Challenger 8P, with dual eight-inch floppy disc drives, resident Basic, and a TV interface which produces 2,048 characters on screen, in 16 colours and with high resolution graphics and sound.

When a data bank is used to maximum advantage it can make a tremendous difference to a company's efficiency, and really lighten a workload.

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Spin-offs should justify space research effort

By Peter Percival

In tho wake of Skylnh's controversinl return to earth, it is worth ro-aaserting the cnso for further apuco reaenrch ond its posaible benofits. Theeo oro porticulorly likoly to ba of Importance in the flold of computing, nccording to Petor Percivol, menoging director of Magnueon Air Traffic Computore. In this orticle he draws on his exporience ee nn eerly mombor of tha British Interplonetary Society, ee one of the teem involved in the British Spnce Programme, and oe a former assistant to Welther Riedl, who wos deputy to Werner von Breun, the Germon rocket engineer who played such an Important rola in the development of the US specs commitmant.

THE National Aeronautics and Space Administration is not exactly America's most popular agency these deys. There is a persistent feeling, In Congreas and in public, that it is an expensive ivory tower — a feeling strongly exacerbated by the long-running Skylab saga.

The agency has not helped itself hy making defensive statements of a crass insensitivity, British radio listeners were told, for Instance, that a political decision had been made between the chance of a catastrophe on Earth and the potential benefits of the Skylab experlments. No doubt true, but smacking of cynicism. Asked whether the experiments had in fect justified the risk, the NASA spokesman seemed less sure.

And it cannot have been very comforting to anyone living under Skylab's path to have been aasured by NASA that the one in 150 chance of anyone's being hit by a piece of Skylab meant that 150 Skylabs would have to fall before anyone was hit. Even a child would find something to worry ahout in that piece of aeronoutic deduction.

However, even accepting that NASA is periodicelly its own worst enemy, I contend not only that It would be a great shame If the Skylab affair led to renewed attempts to limit the space programme; but also that computer people have a bigger stake than most In ensuring that the programme be allowed to continue.

After the US military, the space programme must have been the biggest single formative Influence on both the architecture of large computer systems and the software developed for the processing of large volumes of data. The benefits for minicomputer users are less easily discerned, but are certainly still considerable. Successful computer products and services companies have flourished on the back of the space programme.

Europe, in my opinion, has suffered from its relative lack of involvement in space since the 1050s. From my own experience of working on the Blue Streak project, I can cite a whole string of spin-offs, not least of which was the creation of SE Laboratories. The European Space Agency's 2980s may have been a giant headache for ICL over the last few years, but the company has gained Inestimable software experience from developing the VME/ESA operating system — experience which will filter down to commercial users in dua course.

It seems to me that space projects due to take place In the relatively near future hold a potential for the development of the computer industry that will make past spin-offs look like chicken-feed.

If Skylab's return does provoke a general hostility to space exploration, that will be dreadfully ironic. For Skylab, far from ushering In a new era of lerge debris dropping from the sky, should in fact be an Isolated occurrence. There are about 4,500 man-made objects, mainly satellites and parts of rocketa, orbiting the Earth and fragments from re-antries reach our planet every day.

Skylab was only different because it was very much larger than anything else hoisted into near space — 85 tons of it, of which some 25 tons was not burned up on re-entry and fell to the ground at up to 300 feet per second. But Skylab came right at the end of the "non-returnable" era of space exploration.

Today we are in the age of the space shuttle which can go into space and return from it In a controlled manner and repeat the proceas many times. Not only will the shuttle not itself — God willing — descend to earth In Skylab fashion; it can be used to ensure that no other piece of apace hardware does so in the future.

That is only a subaidiary attraction of the apace-shuttle, of course. For computar people the real Importance of the ahuttle era llea in what has been called the "industrialisation of space."

It has become an article of faith with the embattled NASA that the ahuttle, so far from being simply a space experiment, Is the key to the useful and even profitable exploration of space. Though cold water has lately been poured on some of its more optimistic claims, the agency could be right. And the computer Industry stands to gain more If it is than most.

NASA aays that the industrialisation of space con be divided Into three groupa: new products, new services and new sources of anergy. Though we are all concerned with the third, it is to the firat two that the computer industry should primarily turn Its attention.

The use of space as a factory has several very specific advantages. The first of these Is the near-absence of gravity. When the astronauts aboard the shuttle are not moving around in their suction-cup boots, or firing small rockets to correct the craft's course, gravity will be as low as one-millionth that of Earth.

In such low-gravity conditiona (and even when activity is high aboard the shuttle, gravity will only rise to one thousandth of Earth's) containera are not needed to hold solids or liquids. This is an important factor In the manufacture of things which require a high level of purity — semiconductors, for instance, or optically perfect glass for use In lasers, or fibre optics.

More Importantly, gravity Induces convection currenta which themaelves lead to undasirable atructural differences within solid matarials. It is partly becauas of convection that the distribution of dopanta in crystal growth Is hard to control.

On Earth tha distribution becomes uneven and tha yield of usable chips from a aamiconductor crystal is consequently low.

In space, no such problems exist. Large, perfact crystals can be grown in near-zero gravity with constant electrical properties along their full length. This is not conjecture — It has been done. On the reviled Skylab, Professor Harry Gatos of MIT grew a remarkably uniform indium-antimodine crystal and on the Apollo-Soyuz mission he repeated the feat with a germanium crystal.

Crystal culture In space will reaume in 1981 on the shuttle. The Gatos space crystals were grown, as detractors hastily pointed out, by directional solidification in o closed tube — not a commercial process. Nevartheless the prognosis for space cryatal culture seems good. The yield per crystal should be high enough to justify the cost of processing In apace, and the extra quality should lead to naw applications. Space cryatals, for instance, should yield individual integrated circuits of a size which at the moment it seems impossible to achieve on Earth.

Crystal production looks like being one of the first space manufacturing projects that will be proven, or otherwise. It appears to lend itself to automation, which is important not only because production can continue on an orbiting module while the shuttle itself Is absent, but also because the intervention of astronauts, would diminish the low gravity on which the process depands.

It Is thought that perfect, flawless glaas und opticnl crystals can be produced in spnce, again undar full automation. The Impliclions of this for the terrestrial communications Industry could be enormous, and these materlals could also provide o leap forward in memory and display technology.

On the services side, we have barely started to use space as a communications medium. The spuce shuttle will cut the launching costs of satellites by half — from $20 million to $9 million. The cargo hay will house a mechanical arm that can toss sutellites out like tennis balls, and reach out to retrieve them for repair.

The cheaper the launching costs, the larger and more powerful the satellites can he, and as a corollary the less sophisticated earth stations need be. Rockwell International has sketched out a blueprint for an "antennae farm" — that is, n metol skeleton perhaps 700 feet long supporting up to 30 large-dish antennae — which would be assembled in near-space by the shuttle, then boosted by rockets up to geo-stationary orbit at 22,500 miles.

Just one such antennae farm, Rockwell says, could accommodate five notionwide television channels, and up to 45,000 private communications channels, which could handle calls from literully millions of telephones or data communications devices. So powerful, too, would the transmitter he compared with those now In space that receiving units on earth could he pocket-sized. The engineer who led the Rockwell study Is so confident of the potential of the antennae farm that he thinks Rockwell could take a fixed-price contract now to develop the pocket telephone.

Rockwell goes further. Its president of North American Space Operations, George Jeffs, is already talking seriously of the age of "telecommuting." The potential of multibeam technology is such, he claims, that as early as the 1980s or 1990s workers could he interacting electronically from their homes with machinery In a central office building which could be just down the road or hundreds of miles away. He rightly terms the concept "mind-boggling," but says that it could he part of the answer to the energy crisis as well as allowing people to live in small communities whi[le] performing urban jobs.

Before telecommuting [be]come widespread teleconf[eren]cing, Jeffs believes. This [will] eventually be achieved in [three-]dimensional form using [holo]graphic techniques (per[haps] itself based on compo[nents] manufactured in space — [who] knows?). Just one anten[nae] farm, according to Rock[well], could handle all predicted [elec]tronic mail traffic in the US.

Computer users in ot[her] spheres are also going to h[ave to] grapple with the enormous [in]crease in data which sat[ellite] proliferation will provide. [The] shuttle will make possible [high-]resolution surveying of [the] earth by orbiting bigger sa[tel]lites at a lower cost than [is] now avollable to oil, mineral [and] engineering firms.

Honeywell has develo[ped a] "synthetic aperture rada[r" for] use in space that is so effec[tive it] can pick up small ships, [ocean] waves and even the ar[rangement of] foliage on the ground. It w[ill] record its data on tape f[or] processing on Earth. We[ather] men, of course, are accu[stomed] to processing vast volu[mes of] data. For them, the adv[ent of] extra satellites c[ould] be good news.

The shuttle programme, of course, will generate [demand]ing tasks for the NASA [com]puter men and their sup[pliers] and this In turn will p[rovide] spin-offs which will filter [their] way down the market [to the] benefit of ordinary users.

Anyone who doubts th[at this] process actually occurs [should] meditate on the contribu[tion to] astronomical research [made in] recent years by scientists [at the] Thomas J. Watson Re[search] Centre in Yorktown Heig[hts in] the US. One can be sur[e that] IBM does not fund resea[rch into] such things as the forma[tion of] new stars and the puzzles [of the] shape of galaxies out of [sheer] scientific altruism.

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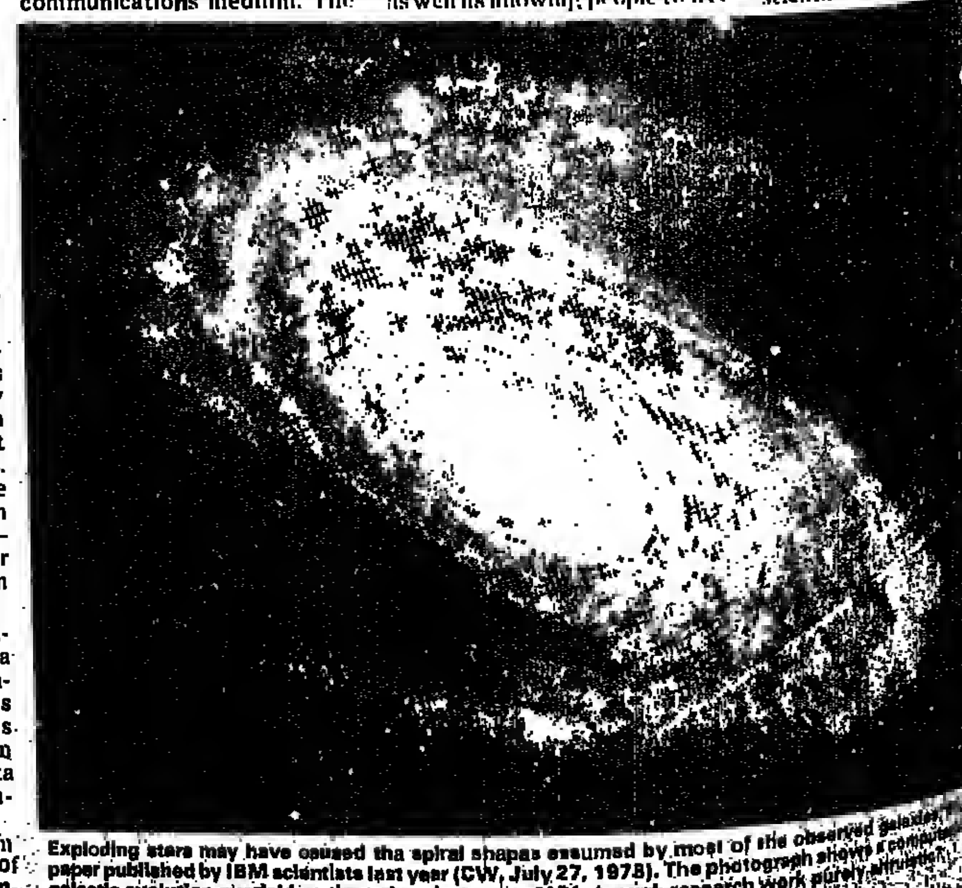


Exploding stars may have caused tha spiral shapes assumed by most of the observed galaxies, [a] computer paper published by IBM scientists last year (CW, July 27, 1978). The photograph shows a computer [simulation of] galactic evolution overlaid on the galaxy known as M81, ts such research work purely altruistic[?]

Tha announcament by IBM of the 4300 series early this year shook tha whole computer Industry, in particular the growing bend of software compatible mechine manufacturers, SCMMs. They seamed highly vulnerable after the 4300 launch even though they were largaly responsible for forcing IBM to make the giant leop forward In price/performance that tha 4300 represented.

Ona SCMM thet reected to the announcament in a decidedly unruffled way was Magnuaon Computar Systems, the firm that devalopad Its M80 family of madium ecole IBM compatible mochines from nothing in less than two years.

Magnuson sees itself in a safer position than other firms trying to compete directly with the 4300. It builds Its own machines using low cost standard logic components. This gives it close control over its production costs and the modular design of its computers, described by Magnuson as "strategic architecture", enables them to be field upgraded with ease over a wide performance range and to be modified quickly to conform with any major design change by IBM.

Magnuaon's responee to the 4341 launch wes to announce three new M80 models, two of which, the M80/42 and M80/43, will uutperform the 4341.

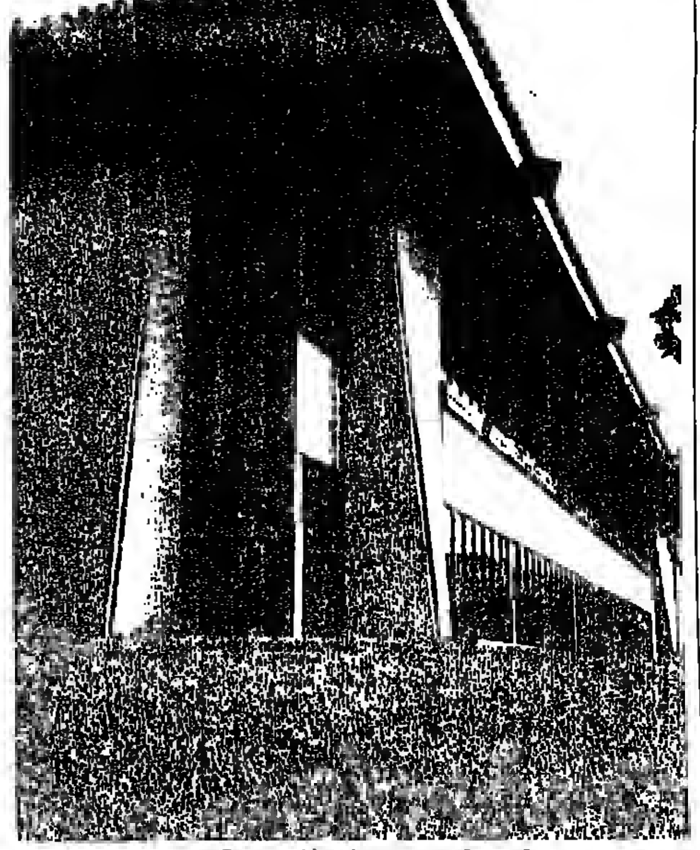
Magnueon's marketing strategy is to offer a customer one of its earliar less powerful models with more or less Immediete delivery while promising that it can be field upgraded to a 42 or 43 next year shortly after deliveries of the 4341 stort.

Magnuson's reason for not shipping the 42 ond 43 now is that it wants to ensure that they ore 100% herdwors end softwere compatible with the 4341.

On a visit to Magnuson's headquarters at Sents Clare, California, Keith Jones of Computer Weekly tolked to two of the company's key men. One wss Joseph Hitt, president of Magnuson and the man most involved in eetabliahing a European marketing operation. The other wss Carl Amdahl, executive vice-presidant technology, who designed the M80 and who believes that his design philosophy will eneble Magnuson to take full odvantage of VLSI — very large scale integration.

Compatibles ready to hit back at IBM

By Keith Jones



Magnuson Computer Systems' headquarters at Sants Clara.

MARKETING of Magnuson computers to the general IBM computer using community in the UK is now getting under way and should be In full swing later in the year after Magnuson Ltd is set up (CW, July 19). Till then potential customers will be taken care of by Magnuson ATC, the Independent agency that was established late last year with the aim of selling Magnuson machines to the air transport industry in Europe (CW, November 9, 1978).

Asked about Magnuson's plans for the rest of Europe, potentially a far bigger market than the UK alone, Joe Hitt gave the firm undertaking, "Marketing of Magnuson computers will start within the next six months."

Listing the alternative marketing avenues being considered, he said, "We may establish our own subsidiary companies, we may use software houses or we could make an agreement with a big company like ITT." He was even considering the possibility of making a deal with one of the European mainframe vendors like CII-HB.

Asked how Magnuson viewed the European market, Hitt commented, "We think Europe will be very good for us because there are lots more small IBM systems than in the US."

Working capital to finance expansion of the company's marketing ond manufacturing operations appears to be readily available, judging from its June announcement that it had closed its second round of venture capitol funding in an oversubscribed position, having received capital offers of about $10 million — twice as much as It had sought.

Magnuson sees this achievement aa something of a "test case" for the ability of the IBM compatible computer industry to attract new venture capital in the face of IBM's increased competitiveness in the form of the new low cost 4300 series.

Hitt freely admitted that IBM'a prices were the biggest threat to plug compatible computer manufacturers.

The new working capital came from a number of sources, including Fairchild Camera and Instrument Corp, which already holds a large minority share in the company.

Hitt stressed that this equity funding waa completely separate from the funding programme completed earlier this year involving several financial institutions, which enables Magnuson now to offer its customers leases ranging from one to seven years.

Hitt pointed out that although the finance has come from third parties, Magnuson itself will write the leasea. Special features of the lease deals that Mognuson can offer include purchaae options with purchase credits that can be accrued at up to 50% of the monthly lease rate and the option of converting a short-term operating leaae to a long-term finance lease without penalty. Hitt belleves that the latter feature is unique in the end user market.

Magnuson already has sales officea in eight major US cities but Joe Hitt is not prepared yet to say how many systems have been sold or Installed, although one well known name in the DP business he quoted was the giant service bureau, ADP, which installed an M80 Model 4 laat November.

Magnuson'a biggeat advantage over IBM is that it can deliver a machine within 60 days that can be upgraded next year to a system that can outperform a 4341.

Hitt claimed Magnuson's biggest advantage over some of its competitors in the plug compatible industry was that it designs, builds and aells its own machines.

Hitt asserted: "This mokes our design more flexible and enables us to control our design changes. If itel wants to make a design change it has to negotiate it with the manufacturer, National Semiconductor. We also have more control over our own costs."

Aaked if the close family ties between Magnuaon and Amdahl Corp could lead to an intimste commercial relationship, Hitt commented: "We have a good relationship with Amdehl, but we are not interested In being takan over by them. A year ago, maybe, but not now."

The product lines of Amdahl and Magnuson complement each other neatly, and Hitt does not sea the two companies competing.

Looking at Amdahi, Magnuaon and the burgeoning plug compatible peripheral manufacturer, Storaga Technology, Hitt commented: "If thoae three firms merged it would be quite interesting."

'Bus structure will keep us up with the leaders'

"THE bus structure of our machines means that IBM 3032 class systema and beyond are realisable."

This waa the confident assertion of Carl Amdahl, explaining why he believed that the minicomputer type bua atructure approach he adopted in designing the M80 should keep Magnuson up with the leaders in computer technology.

Amdahl pointed out: "Machinea with VLSI components will go faster with a bua structure because the distances between the devices will be shorter.

"The bus structure will make it easy to replace printed circuit boards with VLSI components arranged one behind each other lika slides in a allde tray and linked together by the bus connections.

"Thla arrangement will minimise the distancea between components and make it easiar to Interchange components and expand the system.

The microcode in each Magnuson computer in future will be generated automaticelly by software that will aelect re-entrant subroutines from the operating system and translate them into microcode.

According to Carl Amdahl, this is the way that Magnuson will "leapfrog" IBM in the area of microcode and deal with a threat that some industry observers believe is the means by which IBM will deal the knock-out blow to the SCMMs.

Amdahl sees the autometed generation of microcode being extended even to highly used sections of applications programs.

This custom generation of large chunks of microcode for each system would be feasible on Magnuson computers because the two existing models, the M80/3 and M80/4, already have the capacity for 256K bytes of firmware, which could be increased.

"It ia important to point out that the M80 is not a conventional bua-structured machine, but consists of a hierarchy of buses. The CPU, for exampla, is modular with its own bus structure."

Amdahl poured cold watar on the suggestion that Magnuaon might adopt the bit slice approach favoured these daya by a whola atring of minicomputer companies and now, even by meinframe manufacturara, the first baing Univac with its 1100/60.

"With a bit slice architectura tha width of the data patha can be changed but the functions are fixed. What we at Magnuaon want is a function slice architecture where functiona can be added."

At the moment Magnuaon uses standard Schottky TTL MSI logic circuits from suppliers like Texas Instruments, Motorola and Fairchild, but Amdahl raveoled that emitter coupled logic would be employed in future modela with Motorola and Fairchild as the suppliers.

Later Magnuaon would move to ECL/LSI, the technology used already in the large scale mainframes built by Amdahl Corp, the firm founded by Carl's calebrated father.

Asked when Magnuaon would start using 64K bit RAM chips In its memories instead of the exiating 16K, Amdahl commented: "It is an economic consideration rather than technical. Some 64K parts will be available later this yaar and we will use them when they are cheaper than 16K."

In its announcement of the new M80 models earlier this year Magnuson stated that additional memory above the basic two Megabytes would be available in increments of two Megabytes at a price in the US of $15,000 per Megabyte, aa cheap as tha memory that IBM will supply with the 4300 machines.

HITT: 'We think Europe will be good for us because there are lots more small IBM systems than in the US'

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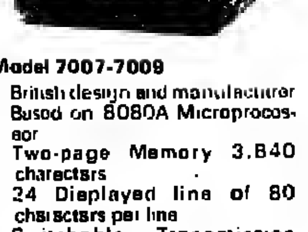

Model 7007-7009

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- ★ Hard Copy Printer Output
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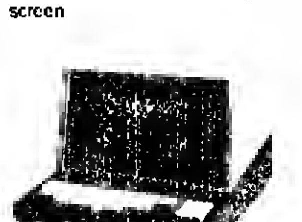

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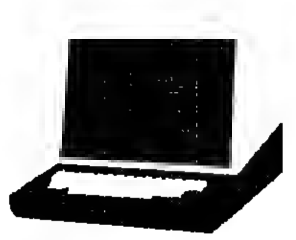
- ★ Dual Interface — CCITT V24 and 20/60 mA Current Loop
- ★ Teletype Compatible
- ★ Hard Copy Printer Output
- ★ Selectable Half or Full Duplex
- ★ Video Output for External Monitors
- ★ Green Phosphor Non-glare Screen



Model 7000

- ★ Teletype Compatible
- ★ 24 lines of 80 Characters per line
- ★ Selectable Baud Rates from 50 to 19,200 Baud
- ★ CCITT V24 Interface
- ★ Selectable Half or Full Duplex
- ★ Green Phosphor Non-glare screen

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PEOPLE AND EVENTS

Top jobs at Nexos and Motorola

APPOINTED to lead a team of microprocessor specialists and to support an OEM sales team for Motorola UK, is **Ian Powers**, who has been promoted to the newly-created position of marketing manager of MPU products for the company.

Powers was previously senior MPU applications engineer for Motorola, and his previous experience includes work on telecommunications and the design of software and hardware systems, mainly with Plessey.

Thomas Powers

Nexos, the office systems subsidiary of the National Enterprise Board, has appointed **Joe Wilkinson** to the board of Nexos Office Systems as financial director. He was formerly financial director of Eurotherm International, where he will remain on the board for the time being.

Chris Steggles, who introduced and developed the Arbat banking system, has been promoted to the new position of senior marketing consultant for the company with overall responsibility for product marketing. He is one of the longest serving members of Arbat, having been with the company for nearly seven years.

Derek Beasley has been appointed head of personnel and administration of Data Logic. For the past year he has been senior industrial tutor in the business studies department at the Polytechnic of Central London, and prior to this was head of personnel for Britiah Olivetti.

Keith Brook has joined the PCA Data Processing Accessories as product manager for the new PCA-Minicare service. He was previously marketing services manager at Philips electrical equipment division and before that was general manager with Pyral.

Tim Lilley, Ken Harvey, David Lines and **Rod Pugh** have all been appointed by Atkins Online aa sales executives, joining the Southern reginn force. Lilley was formerly departmental head with the Help the Aged charity. Harvey joins the company from an M.Sc course in management science at Heriot Watt university. Linea was previously regional engineer for Europe, the Middle East and Africa with Elliott Turbomachinery, and Pugh was an internal auditor with the Department of Energy.

Victor Jeffs has bean appninted DP manager of Cornhill Insurance, based at the group'a Guildford head office. He was formerly employed by the Lowndes Lambert group.

Fairchild appointment

A FORMER general manager of ITT semiconductors, **Dr Gerald Thomas**, has been appointed divisional vice-president for Europe with Fairchild's semiconductor products group.

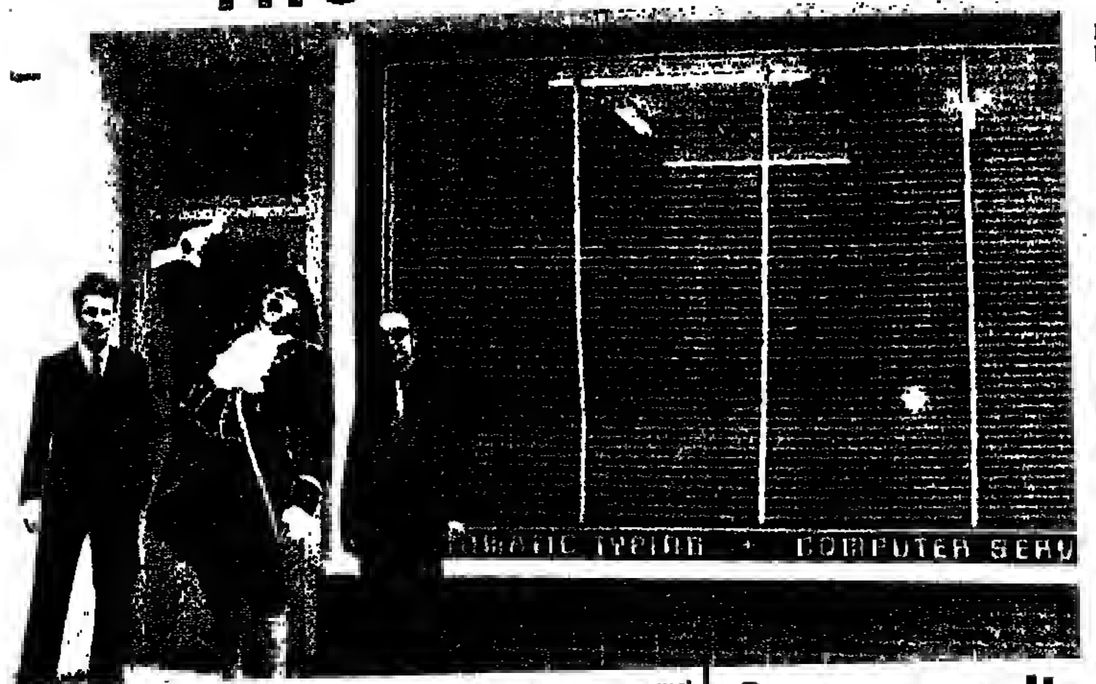
Thomas will be responsible fnr the company's semiconductor operations throughout Britain and Europe, based at Fairchild's European headquarters in Finchley.

He joined ITT as technical director when its semiconductor worldwide group was formed in 1965, and was then promoted to director of operations for the company. Thomas has also worked for Standard Telephones and Cables.

David Ensor, until recently a consultant for Nexus Office systems, a subsidiary of the NEB, has joined Data Recall as marketing director. In this position he will be one of four executive directors of the board. Before joining Nexos, he was general manager with Wordplex Europe.

Ramesh Sethi, internal audit manager with Forward Trust, a subsidiary of the Midland Bank, has been elected chairman of the Institute of Management Services, Birmingham branch.

The White Monk



The town crier of Hastings, Roy Geede, is seen here on an unusual assignment — launching The White Monk, an umbrella processing, instant printing and automatic typewriting service. Pictured with the Crier are Tony White (left) and Michael Monk, partners in the business, which has allied mail house facilities from production to final mailing. The bulk of The White Monk's work load is expected to be word processing with an emphasis on automatic letter writing.

John Farmar has been appointed managing director of Magnetic Components. He has been with the company for the past six years and a director since 1974. He was appointed marketing director with additional responsibility for new product engineering in 1977.

Clifford Harley has been promoted to computer manager for the Leicester Building Society. He joined the society in 1903 in the investment department at the Oadby headquarters. He succeeds **Paul Rylatt**, who has retired after 42 years with the Society.

ICL squash

BRITAIN is to meet Sweden this week in a three-day squash international, featuring the Wilkinson Sword British squad and sponsored by ICL.

The contest is the first international between the two countries and is an important forerunner to the world amateur team championships to be held in Australia in October.

This is the second time ICL has sponsored a major squash competition. The first was in 1978 when ICL's Australian subsidiary supported the successful British Under 25 touring team in Australia.

Soccer results

Division 1
Allergo 6, SIA 1
Allergo 7, Datascene 2
Datascene 4, Atkins 4

Division 3
Computer Wkly 4, ICL 2
Computer Wkly 4, 3Ms 0

DIARY

AUGUST 6-9
Pattern recognition and image processing, IEE Computer Society. Chicago, Illinois. Contact. Pattern recognition, PO Box 639, Silver Spring, MD 20901.

AUGUST 19-22
Third Rocky Mountain Symposium on microcomputers. IEE Computer Society. Pingree Park, Colorado. Contact Michael Tindall, Dept of Computer Science, Colorado State University, Fort Collins, CO 80523.

SEPTEMBER 4-7
Compcon Fall '79. IEEE Computer Society. Capital Hilton Hotel, Washington DC. Contact Compcon Fall '70, PO Box 639, Silver Spring, MD 20901.

SEPTEMBER 6
The future of real time languages in process control. BCS Process Control specialist group. Reading University, Reading. 10.00.

SEPTEMBER 11-12
Computing and communications in the 1980s. Martin Simpson Research Associates. Park Lane Hotel, 36 Central Park South, New York.

SEPTEMBER 17
An afternoon with James Martin. IBM CUA and Butler Cox Associates. The Grosvenor House Hotel, Park Lane, London.

SEPTEMBER 17-19
Fourth International conference on software engineering. IEE Computer Society. Munich, Germany. Contact Prof Fritz Bauer, Institut fur Informatik der Technischen, Universitat, D-8 Munchen, 2 Arcisstrasse 21, Postfach 90 24 20 Germany.

SEPTEMBER 21-22
Database technology for large, distributed and intelligent databases. ACM German chapter. Bad Nauheim, Kurhaus, Germany.

SEPTEMBER 24-25
Computer software requirements. TMSA, London. Tel 01 242 4045.

SEPTEMBER 26-27
Which terminal? Buyers forum. Infotech. The Regent Centre, Carlton Street, London W1. 9.00.

Manager in Midlands

Lee Walkinshaw has become branch manager for Computer People Midlands, part of the [illegible] group. He was formerly European marketing manager with Univac where he was responsible for the launch of the BC17 small business system in Europe.

By Judith Morris

The NCC's education officer George Pennoy (left) becomes a fully-fledged member of the IDPM's council, following the close of nominations last week. The present chairman Neville Toyler (centre) and secretary-general Ted Cluff (right) were re-nominated. The council will decide the allocation of portfolios at its first meeting.

Move to make Cluff's IDPM job full-time

A MOVE is to be made tonight, July 26, at the annual meeting of the Institute of Data Processing Management, to make the secretary-general's job full time.

The meeting, which is being held at the Royal Horseguards Hotel, near Charing Cross Station, at 4:30 for 5:00, will be told that even the 30 hours per week spent by the present job holder, Ted Cluff, is insufficient and that the Institute income of £60,000 is large enough to afford a full time appointment.

Nominations for the 15 positions on the Institute's council closed last week and the 13 candidates are elected unopposed. The council has the power to fill the other two vacancies by co-option.

The NCC's education officer, George Penney, is now officially a member and the offices of chairman, secretary general and treasurer will be filled from the new council.

Nominations were: Ted Cluff, Neville Taylor, Jimmy Macintyre, Nigel Laurie, David Bale, Ollie Davidson, Mike Eaton, Jack Gelly, Roy Hill, George Penney, Vic Thorogood, Fred Thomas and Ewan Robertson.

The last two nominees are new to the council and all members are elected for a three year term with one third of the members resubmitting themselves for election each year.

Bob Marshall has been appointed computer centre manager in charge of Compower's service centre at Doncaster. He was previously centre manager at Edinburgh, where he is succeeded by **Harold White**, formerly head of operations for the Gateshead centre.

Dr Russell Bromley has become sales director UK at Gylling Elektronik-Produkter AB, Oskarshamn, Sweden. He has worked for ICL since 1968 in Kidsgrove and Manchester as a sub-contract manager.

Mike Jenkins, of Siliconix, has become product marketing manager for ICs, for the whole of Europe and the UK. He was formerly a marketing engineer with the company. **David Owen** has been appointed product marketing engineer for discrete devices for the UK and Scandinavia. He recently joined Siliconix from General Electric where he was responsible for European product marketing.

Michael Russell has been named as data processing manager for Unichem. He joined the company in 1977 as assistant data processing manager, and was a member of the team that introduced the ordering system, Prosper.

James Bowie has become computer product manager for the Exchange Telegraph company, Extel. He joined Extel as sales engineer from GEC Reliance Systems, where he was responsible for selling internal communication systems.

Richard Cox has joined Merlin Gerin (UK) as field sales engineer for the company's programmable controllers. He was formerly a sales and contracts engineer with GEC Measurements.

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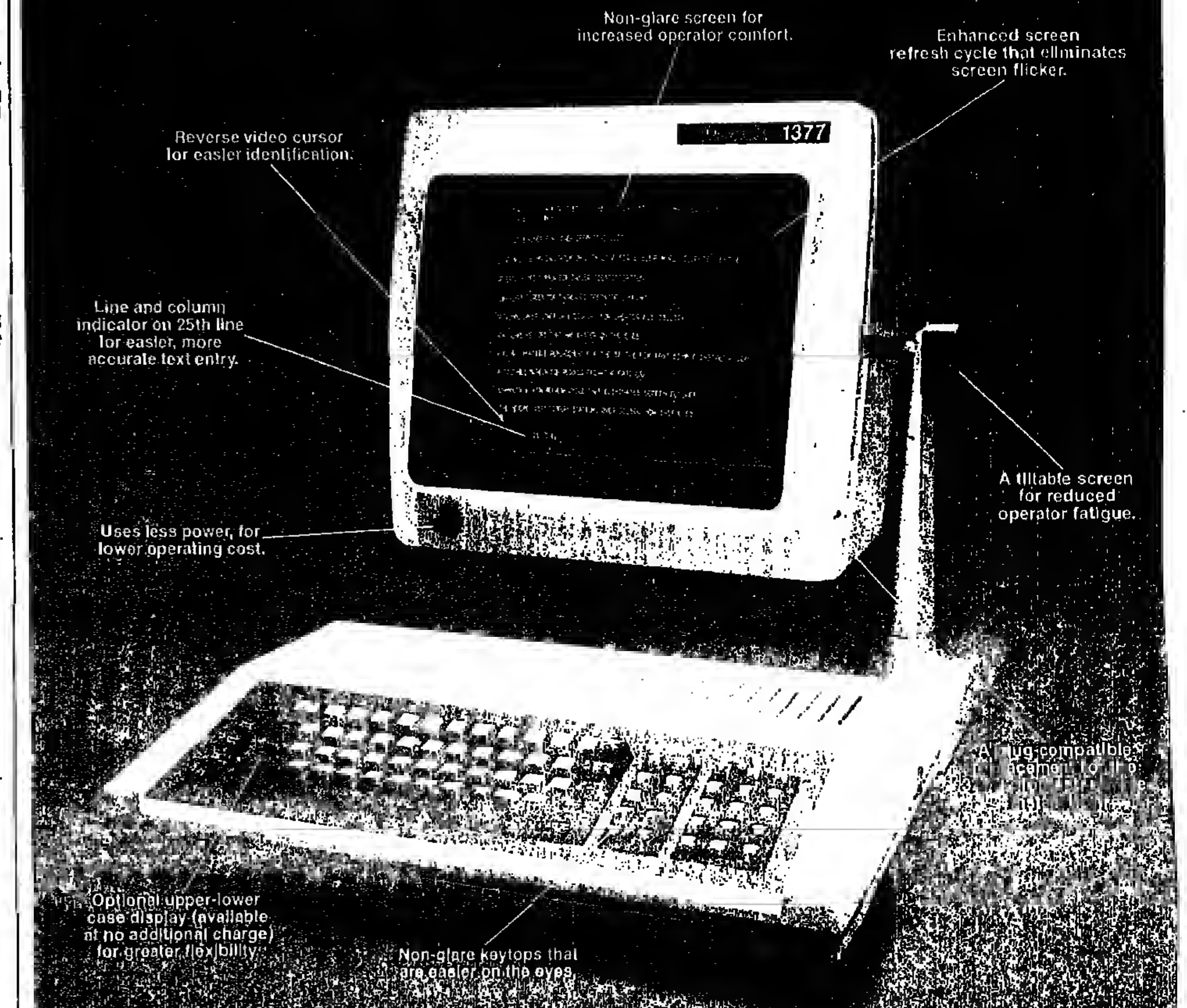

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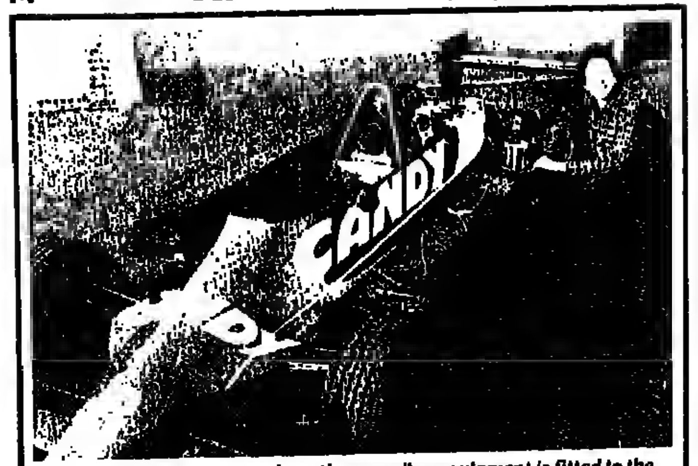

Dr Kempf demonstrates where the recording equipment is fitted to the Candy Tyrrell Formula I racing car.

Monitoring car performance

"IF the driver has time to look at instruments, he's playing about," says Dr Karl Kempf head of a project at the Tyrrell Racing Organisation to research into racing car and driver performance that includes a mathematical model of the driver as a black box information processing subsystem.

The team uses Motorola 6800 family microprocessor devices to collect, reduce and process data from transducers monitoring tyre heat, body aerodynamics, suspension deflection and other aspects of chassis and power train behaviour.

Kempf is to talk about the use of the team's findings in racing car development at the Design Engineering Conference at the National Exhibition Centre in Birmingham on October 22.

● Meanwhile amateur motor rally navigator Malcolm Cann, a member of ICL's project team at Baric, is working out how to use a Nascom-1 with 8K bytes of RAM to aid his rally performance. He wants the system to give him a continuous LED display of average speed, distance to go next checkpoint and other essential information to feed to his driver, his wife Rona, on their rallies with the Farnborough and District Motor Club.

Protect privacy with licences—IDPM survey

LICENSING of personal data applications rather than registration would be necessary for effective protection of privacy, in the view of the majority of respondents to the IDPM survey of reaction to the Data Protection Report.

Of nearly 400 replies, 53% disagreed with the report's espousal of registration, thinking that more rigorous and formal controls would be necessary.

The survey (CW, February 22) was compiled by the IDPM in collaboration with Computer Weekly, and was sent out to all of the Institute's 5,000 members and to over 100 non-members who asked to reply. The results are being published in book form, after submission to the Home Office.

Many of the respondents indicated in comments that registration, with its lack of supervision, would be "too weak" and "demonstrably useless", but others said, "Licensing would make the regulations a bigger problem than the invasion of privacy", and "Licensing suggests even more persona checking information thus defeating the motion to protect privacy".

Those surveyed saw plenty of practical difficulties in implementing privacy laws. One of these would be in obtaining consent from data subjects for the processing of data, and another would be in ensuring that print-outs provided to subjects did in fact contain all the information on the file.

There was plenty of agreement with the notion that manual files also posed a threat to privacy, and a good many respondents thought these too should be regulated.

Several of these last, however, put themselves in an impossible position by affirming at the same time that there were too many manual systems to regulate.

Most of those replying were DP managers. Not surprisingly they felt strongly that they should be more than one [illegible] expert on the Data Protection Authority and 91% thought that such a body as the IDPM should be closely involved with the Authority.

The estimate in the Data Protection Report that £26 a year would be an economic registration fee was treated with scepticism. A figure at least double this would be necessary to cover costs, said many respondents.

Post Office computer centre strikers reject 18% offer

POST OFFICE staff on strike at the Leeds and Harmondsworth computer centres have unofficially rejected the latest management pay offer of about 18%.

The offer was for a 9% increase with 7% for productivity, plus a further 2.25% in shift allowances.

The Society of Civil and Public Servants will vote on the offer next week, but the computer staff have voiced early opposition to it, as it is reported that they are wary of the Post Office offer. This is because the finer points of the deal such as shift payments, co-operation in clearing the telephone billing backlog, and promises of no-victimisation still need to be resolved.

Clearing up the telephone billing backlog is a big job, as it now stands at over £820 million. The Post Office has manually sent out bills for £181 million of this, but the SCPS says that the corporation has only received just over £80 million as a result.

"It is certainly getting enough cash to finance its borrowing, for another 12 months at least," said an SCPS spokesman. "The problem is that even if full normal working is resumed tomorrow, the billing backlog will continue to grow for a month or two. It could reach £900 million before it begins to fall.

"The two important factors in the Post Office attaining a normal cash flow again will be co-operation from the unions involved in the dispute and the unknown quantity of computer system failure as a consequence of overloading."

Such an event occurred earlier this year when a software restriction on the ICL System 4 at Leeds caused problems.

An added complication is that the majority of telephone billing in certain areas is still done [illegible] ageing Leo 326s. The Post Office is trying to remove this [illegible] tion by developing an ICL [illegible] DME, so enabling it to [illegible] the 326 on an ICL 2900 [illegible]

● The Post Office has [illegible] accused of "unreasonable [illegible] monopolistic practices by [illegible] National Utility Service, [illegible] aids businesses by recommending money-saving methods using telephone and telecommunications equipment. [illegible] attack has been launched by NUS because of the time [illegible] some customers are having [illegible] wait for more cost-effective equipment to be installed.

Bid to slow down Aussie technology

STRIKING telecommunications engineers in Australia [illegible] raised the spectre of [illegible] dustrial action next year [illegible] bid to slow the introduction [illegible] new technology.

Members of the Australian Telecommunications Employees' Association [illegible] fighting solely for pay [illegible] but this has resulted [illegible] relatively minor problems.

Because of an [illegible] forecast of demand for [illegible] telephone lines there have [illegible] reports of a shortage of [illegible] modems, but there is an [illegible] of 1,200 and 2,400 bps lines.

Amdahl profits $1.2m despite warnings

HAVING warned that its second quarter figures would be dire, Amdahl Corp provided some comfort for its investors by achieving a net profit of $1.2 million, and by maintaining the dividend at 10 cents a share.

Last month, Amdahl warned that profits would be sharply down because of the strong tendency towards leasing rather than purchasing, and said that it might only break even in the second quarter (CW, June 21).

Less encouraging was that while shipments were ahead of those for the same period of 1978, they were below company forecasts. The sharp decline in sales was reflected in turnover down 23% at $56.5 million. Outright sales show up immediately, whereas lease income is spread over the term of the contract.

In the second quarter of 1978, Amdahl had net profits of $11 million. For the first half of the year, profits were down 28% at $14.8 million on turnover up 5% at $144 million.

Other companies reporting second quarter figures include Honeywell, CDC and NCR, and all were substantially [illegible] the comparable period [illegible]

Honeywell's net profit [illegible] 39% at $61.3 million on [illegible] up 15% at $990.7 million. [illegible] well reported that profits [illegible] the computer side of the [illegible] ness showed a substantial [illegible] crease and that the order [illegible] log for computers remained [illegible] record level.

At Control Data, profits [illegible] up 53% at $37.6 million [illegible] over up 15.9% at $77[illegible] while at NCR profits [illegible] stormed ahead, 46% up [illegible] million on turnover up [illegible] $717.6 million.

Heading for a [illegible]

INFOREX in the US has [illegible] nounced that it expects [illegible] a net loss of $3 million [illegible] second quarter of its [illegible] financial year. It has also [illegible] 160 white collar employees [illegible] redundant. An Inforex [illegible] man in the UK explained [illegible] deliveries were down [illegible] problems with parts [illegible] the company's plant [illegible] ton, Massachusetts.

Build a better understanding with the users of microelectronics

MICROSYSTEMS'80

Wembley Conference Centre, January 30 to February 1,1980

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RORY JOHNSTON AT THE EDUCATION FOR THE FUTURE CONFERENCE

'Prepare for the Information Society or face unemployment'

THE education system is facing a colossal challenge society must be enabled to cope with rapidly changing technology, or it will be torn apart by disaffected young people, in the view of Professor Tom Stonier of Bradford University, who spoke at a conference there on Education for the Future.

At the same time, Stonier pointed out, formal school education is becoming "increasingly irrelevant" through the "by-pass" effect. Parents increasingly worried about opportunities for their children are buying them microcomputers and calculators like the "Little Professor," and as a result children are coming to school knowing more than their teachers, in subject areas such as computers specifically.

Stonier was reiterating his thesis that the education system must be mobilised to prepare people for a massive switch to an Information Society, in order to avoid large-scale unemployment (CW, June 21).

He envisages a world in which 90% of the people work with information rather than in making things, but there is a major problem, in his view, in that economists have no concepts to deal with the creation of wealth by knowledge. Most are still "neo-physiocrats," preoccupied by the importance of land and capital, he thought.

It is knowledge, Stonier said, that could enable the UK to produce large quantities of single-cell protein from coastal fish farming and thus become a food exporter, or to produce oil from coal or electricity from the waves. This knowledge will be the basis of the Information Society, making previously unproductive resources productive.

HOOPER . . . "Human teachers are fundamentally more capable than computers."

Also speaking at the conference was Richard Hooper, formerly director of the now-defunct National Development Programme for Computer-Aided Learning, a quango actually signed into being by Margaret Thatcher (when she was Education Secretary), Hooper wryly pointed out. CAL is still very weak and under-used, even in the US, Hooper said, and there were many reasons for this.

Principal among these, Hooper thought, were the lack of software and the lack of commitment on the part of schools to provide the time for teachers to construct more programs.

CAL is still inflexible in that constructing the learning trees is tricky — it involves "pre-specifying the educational act." Human teachers are fundamentally more capable than computers in that they can understand questions that they did not know were coming, he said.

Hooper did insist that the view of teaching by computer as "dehumanising" is unfair. "Why does no one think books are dehumanising?" he asked, pointing out that at least computers provide some feedback.

Turning to education about computers, Hooper claimed that many teachers working on this did not know what business they were in. Was it mathematics or the social impact of technology they were dealing with?

One point Hooper felt strongly about was that Computer Appreciation courses should not be in the mathematics department. There is too much anti-vocational and anti-relevance bias in formal education in the UK, he said.

There is, however, a distinct shift in educational funding now, away from the DES and towards the Manpower Services Commission's training budgets, partly to get away from this bias against practical training.

The conference heard several teachers describe their experience in using computers to teach other subjects. A project on local history in Suffolk had involved the encoding of sizeable chunks of mid-19th century census returns on an ICL 1903 at Ipswich Civic College. This enabled children to find the answers to large numbers of questions on occupations, place of origin, and so forth.

Beverley Labbett from the University of East Anglia was enthusiastic about the educational potential of the "bare-bones information" the computer can provide. This stimulates children to ask questions they would not otherwise have asked, and to formulate hypotheses.

How to choose

A GUIDANCE note for schools on how to choose a microcomputer is to be produced by the Council for Educational Technology, it was announced at the Bradford conference by Geoffery Hubbard, the council's director. It is hoped that the note will be ready late this summer.

Union's micro education plan

THE white-collar union ASTMS is hoping to raise the consciousness of both the general public and its members about the impact of new technology.

In September a Press and poster campaign is to be launched on the effect of the microelectronics revolution on our lives. It may draw some inspiration from The Collapse of Work, a recent book co-authored by Clive Jenkins and Barrie Sherman.

In December, ASTMS is to run a course on new technology at its Whitehall College. Aimed at senior office representatives, the programme covers the development of new technology and its impact on office jobs, particularly with regard to job security.

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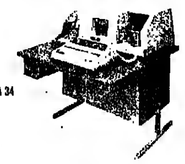

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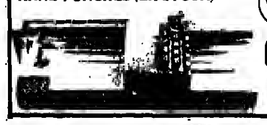

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Some unethical sales techniques

FURTHER to Trader's Sales Bit (CW, July 5), headed, "The way to preserve integrity in selling activities" I have been selling systems and programming support on a time and materials and fixed price basis for a major software house for nearly one and a half years and am pleased that you printed "30 Commandments for Salesmen".

I trust that certain people in our industry take note and perhaps I can outline other methods of unprofessional and unethical selling that are sometimes used by a few of the so-called professional software houses and agencies.

On two separate occasions this year I established programming requirements with prospective customers. Having established our company's manpower resources I profiled suitable, technically qualified staff. On both occasions the candidates profiled, who were currently working for me, had been duplicated by other companies. Clearly these companies had obtained the same requirements but did not have suitable candidates available, so profiled people without first discussing the matter with them. Perhaps "a sprat to catch a mackerel", but embarrassing to the client, the candidate and my company.

Another area for concern is the way in which some agencies and software houses deliberately "doctor" CVs to ensure that candidates are at least interviewed by the customer. Fortunately, in most cases the "grey area" is exposed during the interview. However, if the sales approach is professional and convincing enough, and the candidate is suitable, it should not be necessary to mislead the customer and bring the service industry into disrepute.

Could it be that financial reward for achieving sales targets is the reason for the dubious approaches outlined?

If this is so, perhaps we should all think again and consider both the short and long term implications of approaching sales in this manner, and also bear in mind my own philosophy: "Client satisfaction is my most important product."

MIKE DOHERTY

Hanwell,
London

SCERT still marketed

I HAVE just finished reading the article, "Is your performance up to scratch?" (CW, May 31). I wish to call your attention to an inaccuracy that appears in the accompanying piece, "Users must know what to measure."

The article's author stated that SCERT (not SKIRT) "is no longer marketed." This in fact is false, as Performance Systems Incorporated (PSI) has continued actively to market the SCERT Performance Prediction System since acquiring it from Comten Inc in December 1977. PSI has many domestic SCERT clients as well as several clients in Europe.

H. FRED SILVER,

Vice President
PSI,
Rockville,
Maryland, US.

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

Updating tax tables properly

THE article by Cliff Dilloway, "Updating your payroll programs" (CW, June 21) calls for comment on two points.

In his second paragraph he refers to "the tax tables proper", which may give some of your readers the wrong impression. He was referring to the manual tax tables, as distinct from the recently issued Specification for PAYE Tax Table Routines. I wish to make clear that the latter has the same legal validity as the manual Tax Tables.

Later on in the article Cliff Dilloway makes the point that the logic changes contained in the new Specification do not have to be achieved by any particular date. While that was true at the time he was writing, "Notes on PAYE for Computer Users — Series 6 Number 2" issued last month indicated that the changes should be effected from April 6, 1980 at the latest.

G. O. LAWTON

for Assistant Director
Organisation Division M3/2
Inland Revenue.

Please write . . .

THE EDITOR welcomes letters commenting on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication.

The micro mystery

RECENTLY I came across an article in Autocar, June 10, where once again the mysteries of the micro chip were explained to the readers:

"The silicon chip, or microprocessor, call it what you will, is said to be a threat to our working lives. Whole factories will be run by a box of them, watched over by a lone white coated technician."

It's not difficult to imagine an advertisement in the future:

"White coated technician required urgently to mind busy chip shop."

B. G. LOKOS

Leeds,
Yorkshire.

DPMs: Worlds apart?

WE found your Computerview (CW, July 12) particularly relevant to our own first-time user market in which we have specialised for over seven years as a business, and over 10 as a set of individuals. During this time we have had many happy hours discussing system requirements with data processing managers but must confirm the impression given in your article that often the data processing department is worlds apart from the needs of the users. Let us hope that the common sense generated in your article does become commonplace.

ANTHONY D. HODGE

Principal Consultant
Systems Consultancy,
Chelmsford, Essex.

Algol 68 points made clearer

I AM writing to correct ... small inaccuracies in your ... prehensive report of the Algol ... implementations at the South West Universities Regional Computer Centre (CW, May ...

Both 2900 Algol 68 and ... ties Algol 68 are implementations based on the RS port... Algol 68 compiler written ... owned by RSRE, Malvern. "Algol 68 RS" is the name ... the portable compiler only ... should not be used to des... any of the production comp... implemented from it. An Intro... duction to the RS portable com... piler", written by S. G. Bond ... P. M. Woodward, is avai... from RSRE as Technical ... No 802. The RS compiler is wri... ten entirely in Algol 68.

The project manager for ... Multics Algol 68 compiler ... Rees; the project manager ... the 2900 Algol 68 is Gavin ...

Algol Bulletin 41 (July ... listed 17 Algol 68 implementa... tions, either released ... various stages of develop... Of the ones you mention ... 68R was written by ... Malvern, not by Manchester ... you state, although Manc... uses the compiler on its ... Lindsey at Manchester ... ponsible not for Algol 68 ... for the MU5 Algol 68 co...

Finally, many of your ... may have been puzzled ... cryptic remark that ... ference from PL/I is that ... of being permissive, Al... deliberately restrictive ... ject which really needs ... umns to itself. Could ... haps, print a short article ... subject to put the ... context?

MARTYN TH...

Systems manager,
South West Universities
Regional
Computer Centre,
Bath.

Suppressing technology in the computer industry

STRONG pressures exist in our society towards suppressing high technology. This can partly be characterised as "fear of the unknown". These pressures have somewhat relaxed due to the TV programme "Now the chips are down", and the government's strong reaction to it.

The weakening of the above barrier makes it important to take a step closer, and look at an analogous pressure within computer technology itself.

Computer technology is 98% staffed by people with no knowledge of engineering (or physics). These "technology-free" people have a fear of computer hardware which correlates with the previously discussed general public's fear of computer technology.

Management in industry, and also the politicians, being technology-free and fearing the technocracy as a potentially competing power base, are motivated to "bureaucratise" computer technology — to turn it into a paper, programming, technology-free activity.

It is important to study this "lateral arabesque", where programming, i.e. the contemporary clerk's occupation, masquerades as high technology, microelectronics, wave of the future, Britain's last hope, etc.

Programming masquerades under various unsuitable high technology titles:

Computer science — contains no science.
Software engineering — contains no engineering.
Fault tolerant software — implies hardware content, but contains none. Also, fault tolerant programming is impossible anyway. More reliable systems can only be achieved through engineering.

This bureaucratisation of computer technology cuts us off from the major growth industries of the future, which include.

1 Airline collision avoidance.
2 Systems for sensing and improving traffic flow in the cities.
3 Most of the medical electronics industry.
4 Real time school, bus and train re-timetabling in response to emergencies and user demand.

Each of these industries will be larger than the total "Informatics", Von Neumann, conventional programmer based industry that we seem to propose to restrict Britain to.

Programmers with very little knowledge of physics and engineering control all the "Computer Science" faculties and departments in Britain. There is a very real risk that, with the help of government (diverted from its attempts to support high technology and microelectronics) they will subvert a ... generation of school... away from high technol... towards an updated data ... that is, the programm... computers of ancient ... (which includes the ... processor).

It is possible that Brit... gain a lot of employment ... way, but it is important ... that programming is ... new kind of sweated ... low in capital investment ... high on labour content. ... noteworthy that the ... a software house is ... almost from the moment ... up. This kind of industry ... vulnerable to competition ... was the City.

It is possible that Brit... corner a lot of the world ... ware business in the ... as the City won ... major share of the ... financial business.

In the 1920s and 1930s ... voices in the City ... Britain's future lay ... ture and the City ... Britain did not need ... turing industry. Today ... argument from the ... voices and socio-political ... interests, will argue that ... needs a software industry ... should not be in computer ... ware.

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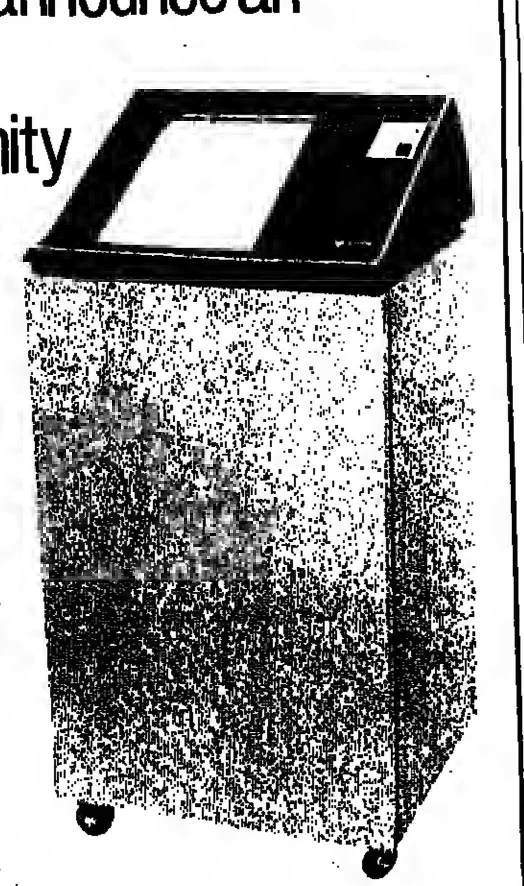

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INTRODUCTION TO PASCAL

Top down to the main program

By Dr Judy Bishop

In the fifth of her 10-part series, Introduction to Pascal, Dr Judy Bishop defines the data structures needed by the Time Checker program, and to write the main program.

A lecturer in computer science at Witwatersrand University in South Africa, Dr Bishop first became acquainted with Pascal when she was studying for her PhD at Southampton University.

Part 5

THE object of this section is to define completely the data structures needed by the Time Checker program and to write the "main program", or in other words, the statements between the program's BEGIN-END pair.

The Statistics file

Following the top-down approach, let us consider what output is required. There is the error report, but that is liable to be messy (errors always are) and not an optimistic place to start. It is far better to look at the principal output, the Statistics file. This is to contain all the Flexitime data since the last analysis. The top-level definition of the file is very simple, namely:

```
VAR statistics = FILE OF flexidata:
```

Pascal files are sequential with all elements in the file being of the type specified. This does not mean that all the elements are identical because a RECORD type may have variants. However, such power is not needed for a simple file of groups of times.

Now what is flexidata? Each employee clocks on or off four times a day and this information is needed to analyse daily patterns. Furthermore, the week number would be useful because there may also be seasonal patterns, such as people arriving later in winter. This leads to:

```
TYPE flexidata =
     PACKED RECORD
          week: 1..52;
          times: onofftimes
     END;
```

That, too was easy; the real crunch comes in defining on-off times.

Four times in a row

There are four instances during the day when an employee should pass the gate. Let's define these as

```
TYPE onoff =
     (inmorning, outmorning,
      inafternoon, outafternoon);
```

We might regret this later if Blaze decides to go into shifts and an outafternoon time is given as 08:00. However, such a move is believed to be unlikely and would not upset the program, only the aesthetic tastes of the programmers.

Onoff gives names to the four times in question. To group the times themselves together we can use the oldest of data structures, the array.

```
TYPE onofftimes =
     ARRAY [onoff] OF times
```

This definition states that onofftimes is a type which is basically an array of four elements each of which is a record of the type time. To put this all in perspective, consider a variable

```
VAR clocking: flexidata;
```

The time this particular employee went off at the end of the day would be given by

```
clocking.times [outafternoon]
```

The actual hour he went off is obtained by selecting the hour component at the end, as in

```
clocking.times [afternoon].hour
```

The whole group of times can be moved around by naming

```
clocking.times
```

or the group for the week would, of course, be called simply

```
clocking
```

The weekly input

Since we decided that the data will be processed weekly, it makes sense to start off the data with the week number. Following that will be lines consisting of the hour and minute when the employee passed the gate. Mentioning the day four times seems wasteful but does have advantages.

1. It provides room for checking the times for inconsistencies.
2. It does provide for shift work later (eg coming on on Tuesday night and going off on Wednesday morning).

In keeping with the top-down approach, we will not specify the precise form of the times yet and go straight on to writing the main program. It is all in Figure 1.

Getting it in

Two of the three statements in the program concern input/output; they will be explained now. Rewrite, and its counterpart reset, are used to open files for writing and reading respectively. The standard files, input and output, are opened automatically and it is invalid to use reset or rewrite on them.

Read is the general-purpose and, indeed, all-purpose input

```
PROGRAM   timechecker(input,output,statistics);

TYPE      hours = 0..23;
          days of the week = (mon,tues,wed,thurs,
          fri,sat,sun);
          time = PACKED RECORD
                   DAY : daysoftheweek;
                   hour : hours;
                   min : 0..59;
                 END;
          onoff                                        =
          (inmorning,outmorning,inafternoon,outaf-
          ternoon);
          onofftimes = ARRAY[onoff] OF time;
          flexidata = PACKED RECORD
                   week : 1..52;
                   times : onofftime;
                 END;

VAR       statistics : FILE OF flexidata;
          clocking : flexidata;

BEGIN
          rewrite(statistics); (* open it for writing *)
          read(clocking.week);
          WHILE NOT eof(input) DO
               inputtimesforoneemployeeforoneday;
END
```

Figure 1. The Time Checker, Mark 1

statement. If the first word in parentheses has been defined as a file name, then reading is done from that file otherwise input is read. Pascal's reading is type-driven or, to use an older term, free-format. Read considers the type of the variable and expects a value of that type to be the next on the file. Thus

```
read (clocking.week);
```

expects an integer between 1 and 52. Some compilers do not give read the power to check subranges but in principle they should. As in the program itself, spaces and ends-of-line are ignored before a number. If Time Checker is being run on week 23, then 23 can appear anywhere on the first line.

"Numbers" with letters

The next item that will be read is an employee number. At this point the input marker is on the character after the 3 (which should be a space). It is now important to know what this employee number looks like. If it is purely digits then the appropriate

```
read (employeenumber);
```

will skip the rest of line one and pick up an integer from line two. However, it is far more likely that Blaze Inc uses the word "number" much like Humpty Dumpty . . . "When I use a Word it means what I want it to mean".

The fact is, that employees are known by an identification tag which consists of the initial of their surname followed by a genuine number. In Pascal, this is

```
TYPE identification = RECORD
          initial: char;
          number: 0..maxint
     END;
```

For example, D. E. Mullins might be employee M2610. Note the careful use of a subrange for the number component. Since it is obvious that this will never be a negative number, we might as well tell the computer so and let it build in a check against this happening. Maxint stands for maximum integer and is a constant defined by most implementations.

```
WITH employee.idnumber DO
     read (initial, number);
```

Reading a character picks up the very next one on the file. But wait! This is currently the space after 23. Therefore we must first position the input marker at the start of the next line. This is done by a readln (ie *read line*) statement so in fact, the reading of the week should be done by

```
readln (clocking.week);
```

NEXT WEEK:
Part 6: Reading times using the Pascal specialities, CASE and sets

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Electronic funds transfer—the next 10 years

Although Electronic Funds Transfer Systems already shift more money by far than any other method in the US, other methods are still used for the bulk of cheque transfers and it seems likely that they will continue to be used. Various reasons are cited, among them controversy over privacy laws and the enormous cost of conversion.

However, use of EFTS is spreading fast, and some analysts believe that it could become the principal method of funds transfer within ten years.

In this article, MORRIS EDWARDS describes the various EFTS systems operating at present in the US, among them corporate EFTS, for money and message transfer between member institutions, Fed Wire, the network that carries Federal Reserve transfers, and retail EFTSs which handle transactions between a bank and its customers.

By Morris Edwards

WILL electronic funds transfer systems ever predominate? In the United States, at least, one might be tempted to answer "No," considering the substantial consumer resistance to electronic banking and retailing, and the controversy over banking laws, security safeguards and privacy matters.

Yet, in dollar amount at least, EFTS is already the dominant payment mechanism in North America. In the US, for instance, financial institutions use EFTS to transfer about 80% of all payments, amounting to some $275 billion daily.

To put the situation in perspective, though, it's important to note that these transactions average about $2 million each, and that non-electronic funds transfers involving cheques still represent the highest volume of transactions.

Even though US banks handle an estimated 30 billion cheques annually, there is no longer any pressure to convert to EFTS to prevent the banking system from "drowning in a sea of paper."

This was the anticipated problem that triggered initial interest in EFTS in the mid-1060s. Since then, however, banks have developed efficient non-EFTS technology for cheque processing, and many bankers believe cheques will be the best way of handling consumer payments for the foreseeable future.

Also, whereas EFTS was initially conceived as the ultimate in consumer convenience, concerns over privacy, security and such matters as "float" have raised questions as to whether EFTS networks are needed or can be afforded.

If financial institutions could eliminate cheques through EFTS, the processing cost of 30 cents per cheque could conceivably be cut by as much as 80%. However, EFTS would have to be used universally to obtain the anticipated savings, and the upfront investment would be staggering.

In view of the costs involved and consumer attitudes to date, some industry analysts feel that a full-scale EFTS network may never arrive. Others argue with equal conviction that systems promise too many benefits for too many people for it to be halted.

One study by Arthur D. Little indicated that, within the next decade, EFTS could become the dominant payment mechanism in both transaction volume and dollar amount. Little reckons that EFTS transactions will represent 17% of all transactions by 1980 and 70% of all transactions by 1990.

While one roadblock after another has snarled development of full-scale EFTS networks for consumers, financial institutions have profited from the availability of advanced communications networks for rapid and secure funds transfers among themselves (corporate EFTS). On the international scene, the principal networks for corporate EFTS are Chips and Swift.

Chips, an acronym for Clearing House Interbank Payment System, was established by the New York Clearing House Association in 1970 as a means of eliminating cheques as a payment medium for international interbank transfers.

Currently, the network is handling interbank money transfers of $100 billion a day at the request of US and foreign banks, involving an average of 45,000 transactions. To handle this traffic volume, Chips employs 350 terminal computers, located in varying numbers in the 80 participating banks, all of which must be physically located in New York City to qualify.

Leased telephone lines link the terminal computers to a Burroughs B6700 triple processor system in the Clearing House computer centre. As the transactions and messages are processed, the central computer updates pertinent records in its disc and memory files and produces balance position reports and item-by-item detail reports at the end of the day.

Unlike CHIPS, which functions as an automated clearing house for interbank money transfers, SWIFT is not a funds transfer or interbank settlement system. Rather, it is a message system established as a computerised link between European and North American banks. It is remarkable in that it represents agreement among European and North American bankers to standardise communications interfaces and formats to handle a wide variety of international transactions.

Fully operational since 1977, SWIFT now links over 570 banks with about 1,800 branches in 17 European countries, the US and Canada, and handles over 114,000 messages daily. According to Peter N. Drummond of the SWIFT organisation in New York, Japan will be joining the network "in the next year or so," and he says that many other countries have expressed interest in doing so too.

Each country utilises a Burroughs computer configured as a concentrator, which receives input from domestic banks on a variety of private and dial-up lines. Most concentrators connect to one of two switching centres, in Amsterdam and Brussels, over leased lines operating at 9,600 bps.

For smaller, neighbouring countries with limited traffic, the concentrators are typically connected in series and share a link to the switching centre. Reportedly, a third switching centre will soon be added to the network in Culpepper, Virginia.

Culpepper is also the location of the switching centre for Fed Wire, the name given to the network that carries Federal Reserve transfers. Fed Wire uses a star-type network to link all 12 Federal Reserve Bank head offices to the Culpepper switching centre. Each head office is also the centre of star-type subnetworks which connect 25 Fed branches and more than 200 member banks into Fed Wire.

According to Howard Crump, adviser to the Federal Reserve Bank of New York, the long range goal with Fed Wire is to replace the centralised star-type configuration with a distributed packet-switched network. At present, the Culpepper centre switches 58,000 transactions a day, transferring an average $150 billion in Federal Reserve funds and government securities between member accounts at the Federal Reserve.

Since September, Fed Wire has also linked all 32 Automated Clearing Houses into a nationwide electronic payments network. Through the network consumers and corporations now make use of ACH services such as direct deposit payments and automatic bill payments anywhere in the contiguous states.

ACHs are institutions analogous to the clearing houses for the interchange of paper cheques, except that transactions are carried on magnetic tape rather than on the paper cheques. Two types of payments move through ACHs: credit payments, such as social security or wage payments, which result in a deposit of funds to an individual's account; and debit payments, which transfer funds from an individual's account to that of another, for example, an insurance or mortgage payment.

One controversy surrounding ACHs is the role of the Federal Reserve, which operates all but the New York ACH. On the one hand, the Privacy Protection Study Commission recommended that no government agency play any part in the system because of potential threats to personal privacy.

On the other hand, proponents of Federal Reserve operation of ACHs argue that it is simply an extension of the traditional role of cheque processing and that no private institution would be willing to assume the ACH operation at reasonable cost. It was perhaps this latter realisation that led the National Commission on Electronic Fund Transfers to recommend unanimously that the status quo be maintained.

Despite the dominance of Fed Wire in the US, private banks have taken the initiative in developing cost effective networks for interbank payments without government involvement or direction.

Bank Wire, for instance, was established in 1952 by 13 Chicago and New York banks to transmit funds transfer and administrative messages to more than 230 participating members. Last year, Bank Wire II took over the funds transfer activity among the 185 member banks, providing them with improved "reliability, accountability and flexibility".

Developed over three years at a cost of nearly $10 million, Bank Wire II operates 30 times faster than its predecessor system. It is currently processing more than 18,000 messages daily, involving funds transfers in excess of $20 billion, though it can accommodate more than three times this payment message volume.

While the communications facilities are in place to handle corporate EFTS, no such integrated nationwide network exists for retail EFTS. Conceivably, one could be built on Fed Wire or Bank Wire, but a single network raises Big Brother issues as well as fears that the nation's 14,300 banks and 7,000 thrift institutions might be consolidated into as few as 100 national organisations.

Some observers feel that EFTS cannot bloom fully until the independent datacomm systems established by retailers, banks and thrifts, the Fed and corporate America are somehow tied together. Others argue that EFTS is best handled by a multitude of computer networks. Whatever the relative merits of the two approaches, retail EFTS has historically developed on a local, or at most a state-wide level, and with only a few of the possible EFTS options.

Few financial institutions could afford the investment that Citicorp has ploughed into its electronic banking operation, known as Citicard Banking Centres, or CBCs. Over the last ten years, it has spent about $100 million in developing the electronic system.

Most of the CBCs are located in Citibank branches, though a few of them are in stand-alone kiosks. Most contain two Customer Activated Terminals, or CATs, which customers may use to deposit and withdraw cash, transfer funds between chequing and savings accounts, make payments on Citibank mortgage and bank card accounts, and find out their account balances. Getting into the bank after regular hours involves inserting a plastic Citicard into an electronic door-opening device. The same card activates the automatic teller machine when used with a personal identification code.

Citibank uses an electro-optical reading technology imbedded in its card, which the bank feels is substantially better than a magnetic stripe since it cannot be copied as easily and is harder to scratch or damage. A wholly-owned subsidiary, Transaction Technology in Los Angeles, developed the CAT, which is more efficient and sophisticated than a conventional automatic teller machine, providing simple, step-by-step instructions to lead the customer through the various transactions.

"Contrary to some predictions, the machines don't intimidate people one bit," says Richard Kovacevich, senior vice-president. "More than 86% of customers who have used them once use them again."

Kovacevich also reports that the CBCs are handling transactions at the rate of almost two per second every day and that about 40% of all CBC usage is during normal working hours, indicating that customers are using them to avoid queues at teller counters and to save time.

'Expectations are clouded by lukewarm attitudes'

Towards the cheque-less society?

Also in New York, Chase Manhattan is pioneering another EFTS area — Giro-type processing of authorised payments to organisations such as retailers and life insurance companies via ACH debits. Chase vice-president George White, a well-known advocate of electronic Giro systems, explains that the concept requires the payer to initiate the funds transfer by ordering a payment to be made from his account. As such, it is the exact opposite of the cheque mechanism, where the actual transfer of funds is triggered by the person who receives the cheque when he cashes or deposits it.

European Giro systems are often handled by the country's PTT, White points out, with financial accounts maintained at the postal services and payment instruments moved physically. In the United States, however, Giro systems would typically use an electronic payment infrastructure such as ACHs.

Another approach to limiting paper flow is cheque truncation, where cheques are microfilmed by the payer bank and then destroyed, with the customer receiving all "pertinent information" regarding the cheque but not the cheque itself as a record of the transaction. Ultimately, this concept is expected to lead to truncation at the bank of first deposit since this will save the banks more money.

'Identifiable and long-lasting trends are developing that will affect both financial institutions and the industries that service them...'

In this case, the cheque will be microfilmed and destroyed by the bank where it is first deposited and the pertinent information entered into the bank's computers; subsequent transactions involving the cheque will be handled by communications between computers at the various banks.

Not surprisingly perhaps, there has been little progress to date in implementing cheque truncation in the retail EFTS environment — and having it accepted by consumers — though many firms are utilising these concepts for corporate funds transfers.

In the face of uncertain legal and legislative outcomes and lukewarm consumer attitudes, what kind of future can be expected for EFTS in the US? According to International Resource Development of New Canaan, Connecticut, while the near-term expectations for EFTS are clouded by uncertainty from several areas, identifiable and long-lasting trends are developing that will affect both financial institutions and the industries that service them.

In its report, Data Communications and Banking, IRD lists the following developments as likely to evolve over the next decade:

- Formation of a national ACH network sponsored and encouraged by government programs emphasising pre-authorised payments and charges to reduce anticipated paper volume. Such a network will be competitive with, but will not replace, traditional processing operations.
- Development of national bank card networks that will serve to transmit information and to support debit card use.
- Formation of an organisations structure to monitor the direction of point-of-sale systems and automated banking devices by banks and third-party entities.
- Spread of automated banking equipment throughout the financial community at a rapid pace.
- Increase in holding company acquisitions promoted by the smaller bank's disadvantage in keeping pace in an automated environment.
- Increase in bank services to retailers in the area of inventory control, bookkeeping, reordering and the like from data collected from the EFTS equipment.
- Increase in the direct deposit of payroll as the trend filters into the business community.
- Increase in preauthorised charges and credits as postage costs continue to spiral.
- Development of industry-to-industry automatic payment systems such as those in the transportation and utility fields.

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Design engineers and software specialists with the experience, qualifications and ability to drive the project forward will start in a salary range up to £9,500 p.a. There is ample scope for promotion. Generous relocation expenses will be paid where appropriate.

LIVING

Apart from reasonably priced housing, the Liverpool area offers many unique attractions. In addition, the motorway network brings the North Wales coast and Snowdonia, as well as the Lake District, within easy reach.

ACTION

Take a look at our 'Information Package'. Ring Bob Wooding between 9am and 5.30 pm on Liverpool (051) 228 4830. He will send you the package and may put you in direct touch with our hardware and software team leaders. Alternatively, post the coupon to Ray Beeston.

CUT HERE

To: Ray Beeston, Plessey Telecommunications Limited, Edge Lane, Liverpool.
Please send me the System X Information Package.

Name

Present Job

Address

Qualifications

Home Tel No.

CW1

PLESSEY
telecommunications

MYRIAD

SENIOR ANALYST

TO LEAD DATABASE DEVELOPMENT FOR IBM4300 HARDWARE

MIDDX. (HAYES) **£7500**

Our client is a leading manufacturer and supplier of bulk plastic products for the building industry and is expanding at an impressive rate.

Their current kit comprises an IBM 370/125 soon to be upgraded to a 4331, with a 4341 on order for 1981.

The Senior Analyst will be required to build and lead a database development group comprising a skilled team of analysts and programmers. The person appointed should therefore be able to offer a sound analysis background, preferably gained in a manufacturing environment and, ideally, some experience of an IBM database management system. A programming background would also be advantageous.

This is an ideal opportunity for a person seeking career progression in a dynamic environment and further advancement to Project Manager status can be expected in the near future.

Ref. SW1/2607

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981 (24 HOURS)

SOUTH WEST UNIVERSITIES REGIONAL COMPUTER CENTRE
UNIVERSITY OF BATH

ALGOL 68 COMPILER DEVELOPMENT

Vacancies exist for two systems software programmers to join a small team developing Algol 68 compilers. The team has responsibility for future development of the ICL 2900 Algol 68 compiler, which has just been released and is already in use at a number of sites in the UK and abroad. Other members of the team are currently designing a compatible compiler for Honeywell Multics systems. An additional person is sought for each of these projects.

The posts provide an exciting opportunity to gain detailed experience of compiler development, and to design and write software which will be used throughout the world. Both ICL VME/B and Honeywell Multics are used interactively for development.

Algol 68 and compiler experience would be an advantage, as would knowledge of either machine's instruction set. However, the ability to learn quickly and work in a professional way is equally important, and recent graduates or postgraduates are encouraged to apply.

The posts will be for a period of two years, and salaries will be in the range £3775-£7521 (from October) plus a cost of living supplement yet to be agreed.

Further details and application forms, to be returned by 23.8.79, from the Personnel Officer, University of Bath, Claverton Down, Bath BA2 7AY, quoting ref. (79/175CW).

TYNE AND WEAR COUNTY COUNCIL
COUNTY TREASURER'S DEPARTMENT

COMPUTER PROGRAMMERS

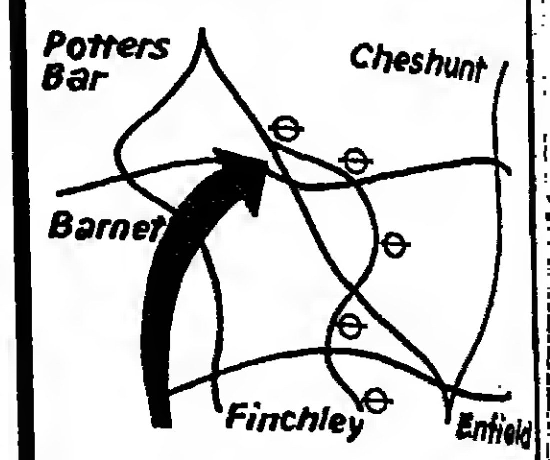
Salary up to £5,073 (Pay award pending)

Applications are invited from experienced personnel or from persons wishing to enter the programming field for the first time.

The successful applicants will join a highly skilled and experienced development team working on a wide variety of financial, administrative and technical computer systems.

The County Council operate an ICL 1904S computer with 256K core store, 11 EDS60, magnetic tapes and drums, which supports a communications network over 50 terminals, used for on-line processing, data capture and MOP development.

Written applications, stating age, qualifications, current salary and experience to date, and naming two referees, should be sent, not later than 3rd August, 1978, to the County Treasurer, Tyne and Wear County Council, Sandyford House, Archbold Terrace, Newcastle upon Tyne NE2 1ED.



Our clients are located at Cockfosters, close to the Underground station (Piccadilly Line), and parking is not a problem. Working conditions are congenial, and a favourable employment package is offered, including annual bonus and four weeks' holiday. Due to expansion, career prospects are good.
Currently, information systems for a unique service to the international shipping industry are being developed, including on-line applications using a mainframe with 250 MB on-line disc storage.

PROGRAMMERS Up to £5,500

Upwards of two years' programming experience ON ANY MACHINE is required, including substantial COBOL. The job offers the opportunity of involvement at management levels, taking responsibility and using initiative. (Ref. 806W)

Please ring us in confidence for an initial discussion, quoting the appropriate reference. Messages after hours will be recorded.

EDP SYSTEMS LTD
52-53 Margaret Street, London W1N 7S
Telephone 01.637 5796 (24 hours)

SYSTEMS PROGRAMMERS

GET TO THE CENTRE OF THINGS in Surrey

As a Systems Programmer with our client you might be involved in the replacement of MFT with OS/VS1; in seeing the implementation of VM is successful; in helping with the installation of 4300 hardware. You might be evaluating t.p., database or other software products or controlling their implementation; providing consultancy or technical support to users throughout Europe; or providing support for a major message switching network.

The data centre is based in East Surrey. Using Honeywell, GA, IBM, Prime and Datapoint minis, with IBM mainframes, services are provided for clients throughout Europe and the Middle East, opportunities will therefore arise for overseas travel. Significant changes are taking place and successful applicants will be a part of and will make a contribution to these changes.

Candidates should either have a good systems programming background in an IBM virtual operating system environment or have solid message switching experience. Knowledge of t.p. monitors, databases or SWIFT would be an added bonus.

As you can see opposite a first rate benefits package is offered, including a starting salary negotiable dependent on experience and you would be joining a well-trained and professional technical group. To find out more telephone Capp Associates.

Starting Salary to £9,000

- Call out allowances where applicable
- Up to 4 weeks formal technical training each year - possibly more some years.
- Subsidised mortgage after 1 year
- Subsidised staff restaurant
- Annual bonus
- 22 days holiday
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- Low interest loan facility
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- Active sports and social club

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF. CW160-9H

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CAPP ASSOCIATES LONDON AND MANCHESTER
Computing Services Association
01-686 9693
A.M.P. HOUSE, DINGWALL RD., CROYDON CR9 2AU

HARDWARE PRODUCT DEVELOPMENT

West Midlands **£8,000 + car**

Our client seeks an experienced engineer, ideally with DEC or Data General experience, but other backgrounds will be actively considered, for an exciting career post.
You would produce, and support the marketing of commercial micro-systems which are a well-planned extension to our client's existing sizeable and successful minicomputer business.
You should offer a background in mini/micro computer technology, and be able to develop micro systems for general commercial use from components manufactured and supplied from a highly reputable and established source.
A knowledge of operating systems, diagnostic routines, and the ability to commission completed systems including software, would be ideal.
Any experience in liaison with manufacturers and customers would be very valuable.
This unique position offers the real opportunity to progress into a general managerial role as the company expands to provide commercial systems in this rapidly growing area of computing.
The company has extremely detailed and accurate plans for the future of this venture, and intends to involve the successful candidate fully in the setting up and future of the organisation.
General condition, such as pensions, free sickness benefit, six weeks holiday, hardware familiarity training, and company car are well above average.
A small number of more junior posts may be available for hardware engineers with a minimum of twelve months' experience. So if your interests lie in micro systems, please contact Mike Hessien, reference CW 185 for a strictly confidential discussion.

CPC COMPUTER PERSONNEL CONSULTANTS
4th Floor, The Rotounda New Street, Birmingham B2 4PA. 021-632 6848

Systems Analyst

Senior enough to build a Computer Department

Watford Attractive salary + car

Cape Insulation Services Ltd., the largest domestic insulation contractors in the UK and part of the highly successful Cape Industries Group, currently require a Senior Systems Analyst.

Applicants (male/female) should have had several years' experience in all aspects of systems design and installation, preferably in a service or contracting business.

The successful candidate will be prepared to see through a complete development from the existing bureau operation to own machine in the shortest possible time.

The position offers a unique opportunity to develop the Data Processing function in a fast growing Company with consequent promotion opportunities.

Please write, or telephone, for an application form to:- Peter Reynolds, Personnel Manager, Cape Insulation Services Ltd., Rosanne House, Bridge Road, Welwyn Garden City, Herts. AL8 6UE. Tel: Welwyn Garden 31155.

Cape Insulation Services Limited

LONDON BOROUGH OF BARKING

BOROUGH TREASURER'S DEPARTMENT

Computer Manager/ess

Grade PO2(a)
£7,365-£8,109 inclusive
(pay award pending)

Applications are invited from suitably experienced persons able to communicate with and motivate staff. The Council has an IBM 370/125 with 4 disc drives and 2 tape drives, using RPG II, and the ability to make full use of this installation and develop and implement new on-line systems and procedures is required.

Application forms from the Borough Treasurer, Civic Centre, Dagenham, Essex. Tel. 01-592 4500, Ext. 382.

Closing date: 8th August, 1979.

MERSEYSIDE COUNTY COUNCIL

SENIOR TECHNICIAN

(£4,773-£5,073 p.a. inc. supplement)

This post is in the Research and Forward Planning Section and deals mainly with the computerisation of the Industrial Waste ... in the form ... the presentation of this information in the ... preparation of the Waste Disposal Plan.

The successful applicant, who will possess an appropriate ... in computer science, will be required to provide mathematical ... and computing services. Experience in interview techniques ... with public bodies would be an advantage.

Application forms, returnable by 17th August ... details from the County Engineer, 4th Floor, ... Canning Place, Liverpool L69 3EL (Tel. 051-227 ...

(Please quote Ref. No WD513 in all correspondence)

NORTH WEST VACANCIES

PRESTON c. £7,000 + Bonus
SYSTEMS ANALYSTS
Our client is seeking well educated Systems Analysts with over 2 years experience on financial or commercial applications. Candidates must be business problem solvers, and have seen projects through to completion.

NORTH MANCHESTER c. £5,900
SENIOR PROGRAMMER
Major UK Organisation requires a Senior Programmer with solid COBOL and supervisory experience to head large development team on major systems.

SALE £5,500
COBOL PROGRAMMERS
Our client requires COBOL Programmers with 2 or more years experience to work on a variety of applications. ICL experience preferred but not essential.

LIVERPOOL £6,250
SYSTEMS ANALYSTS
Large commited D.P. user is seeking 2 Systems Analysts who have seen systems through, and have a programming background preferably in COBOL.

OLDHAM c. £5,800 + Bonus
SYSTEMS ANALYSTS
Systems Analysts with sound large systems experience are required to work on real-time commercial developments. Latest Hardware and systems in operation.

OLDHAM to £4,700
ANALYST/PROGRAMMERS
Our client is seeking young Analyst/Programmers who have gained at least 1 years COBOL experience and have had some analysis involvement. Interactive, Data-Base applications.

WARRINGTON to £6,000
ANALYST/PROGRAMMER
Our client urgently requires a Systems Analyst with good COBOL, ideally on ICL hardware, with on-line applications experience to lead small development team. Good benefits available.

NORTH MANCHESTER c. £7,000
SENIOR ANALYST
Large manufacturing company requires a Senior Analyst to head on-line development team of both Analysts and Programmers. Must have sound COBOL experience and in-depth analysis background.

PRESTON c. £5,000 + Bonus
COBOL PROGRAMMERS
Young COBOL Programmers with around 2 years commercial/manufacturing background can gain the latest on-line applications experience with a major UK organisation. IBM experience an advantage but not essential. Very good benefits.

STOCKPORT to £5,200
COBOL PROGRAMMERS
Our client requires COBOL Programmers with 1 to 2 years experience in a large installation. Outstanding career prospects.

MANCHESTER to £6,000
SYSTEMS ANALYST
Systems Analyst with 2 years experience together with some programming knowledge is required by large IBM user. Background in CICS environment is an advantage.

MANCHESTER c. £4,500
COBOL PROGRAMMERS
To supplement development teams our client is seeking young COBOL Programmers with over 1 years experience. Large Data-Base on TP application development projects.

PRESTON to £7,500
PROJECT LEADERS
Senior Analysts or existing Project Leaders are required by major company currently undertaking large systems development. Professional, mature staff can enjoy outstanding prospects.

Phone **STEVE SYKES** on **LEEDS (0532) 444185** (day) reverse charges if necessary or on **LEEDS 662417** (eve and weekends)

LORIEN COMPUTER SERVICES
OCS House,
Servia Road, Leeds LS7 1NJ
Telephone 0532 444185
Recruitment Consultants (24 hour Ansaphone service)

MERSEYSIDE

Our client is seeking a number of DP professionals, at a variety of levels, to cover major developments utilising the latest IBM technology, including B100 SNA architecture systems.

SYSTEMS ANALYSTS TO £6,400 + BONUS
Analysts with sound commercial or manufacturing experience are required to work on large on-line systems. These include Materials and Production Control, Financial, Marketing and Works Operations applications.

ANALYST/PROGRAMMERS TO £6,400 + BONUS
Candidates should have gained good COBOL experience ideally, but not essentially, on large IBM hardware, together with some systems involvement. DL1, CICS and Distributed Processing experience can readily be gained.

PROGRAMMERS TO £5,650 + BONUS
Attractive vacancies exist for a number of ambitious programmers who should have a minimum of 18 months' experience which need not be on IBM hardware.

BENEFITS
In addition to a very attractive salary package, our client offers outstanding benefits including a subsidised canteen, concessionary rates on company goods, pension scheme, Flexitime and paid overtime.

CONTINUOUS TECHNICAL AND PERSONAL DEVELOPMENT TRAINING IS GIVEN AT ALL LEVELS.

To find out more about these challenging opportunities in a truly professional, progressive environment, contact:—

STEVE SYKES on LEEDS (0532) 444185 (daytime) or LEEDS (0532) 662417 (evenings and weekends), or write with career details to our Leeds office quoting reference 2CW. We are happy to talk to you at any time.

LORIEN COMPUTER SERVICES
OCS House,
Servia Road, Leeds LS7 1NJ
Telephone 0532 444185
Recruitment Consultants (24 hour Ansaphone service)

YOUR BACKGROUND

- ★ SUCCESSFUL SALES RECORD IN ONE OF THE FOLLOWING:
  - ● SMALL BUSINESS SYSTEMS.
  - ● VRC EQUIPMENT.
  - ● BUREAU SERVICES.
  - ● SOFTWARE PACKAGES.
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- ★ CORTINA OR GENEROUS ALLOWANCE.
- ★ DISCOUNTED SHARE PURCHASE AND BUPA OPTIONS, ON GOING PRODUCT AND SALES TRAINING.
- ★ OUTSTANDING CAREER PROSPECTS

For further details, plaees telaphone Reg Heeth **021-643 2317** or evenings/weekends **021-351 4237**

Expanses peid, interviaws will be held in eny of tha abova areas. Ref. RH/099/CW 26/7

Our Clients, based in Coventry, are a privately owned, highly successful, well respected supplier of turnkey mini computer systems with a substantial and impressive client base.

The Company market prestigious hardware products coupled with wide ranging application packages and provide excellent technical support which together should enhance your own personal success.

The candidate should be self- motivated, confident and have a proven sales record within the mini computer sales field and be between 25 and 35 years of age bringing to our Client a great deal of enthusiasm and commitment.

In return you will be given a substantial income package plus company car and a realistic and achievable sales target.
If the opportunity of working with a young, professional management and sales team whose organisational structure can offer real career progression appeals to you then contact, for an immediate interview:
RICHARD CHAMPION ON: 021-236 3781 (24-hour answering service) OR: HAGLEY 884166 (evenings and weekends).

London 01-935 0671 3 Mandeville Place, Wigmore Street, London W1M 5LB
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA

OXFORD

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You will assist with systeme design, program specification, systems testing and implementation, training will be given whero necessary commencing selery circa **£4800.**

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POTATO MARKETING BOARD
P.O. Box 58
Oxford OX4 3NA
or ring J. P. Belcher, on Oxford 772111 ext. 31 from 30th July

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Donnelley Direct Marketing Ltd,
King House,
5–11 Westbourne Grove,
London W.2. Tel: 01-221 1500

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For further details contact:
Bridget Kotchie
RENDECK LTD. 100 New Bond St. London W1. Tel: 01-629 5438

Rendeck Recruitment Consultants

SYSTEMS ANALYST

£5922-£6537 (Review 1.7.79)

Applicants should have had at least two years' experience in all steges of systems analysis work and be familiar with ICL equipment. Public service experience would be useful but is not as important as broad experience of commercial applications.

SENIOR PROGRAMMER

£4968-£5763 (Review 1.7.79)

If you have had at least two yeers' experience of Cobol programming for Disc systems and Georga II experience then we can offer you the opportunity to lead a small team engaged on the development of a variety of financial and non-financial systems.

PROGRAMMER

£3474-£4827 (Review 1.7.79)

With formal training in Cobol you could fill the above post. Ideelly we would also like at least six months' experience and a knowledge of disca, peper tape and ICL equipment. However, we would also conaider thosa who heve recently completed an appropriate course.

Tha computer installation is a 32K 1901T with EDS 60s and the section is involved in important end varied financial and non-financial systems.

The benefits package include assistance with housing and a scheme of relocation allowances.

THREE RIVERS DISTRICT COUNCIL

Further details end an application form are aveilable from the Manpower Manager, Three Rivers District Council, 17/23 High Street, Rickmansworth, Herts WD3 1ET. (Tel: Rickmansworth 76611, Ext. 50)

Test and Commissioning Engineers
Test Engineers

GEC Computers Limited, the country's leading manufacturer of real-time computers, is expanding its recently opened manufacturing facilities at Ounstable, Bedfordshire.

Our success is largely due to the high quality of our products and our test and commissioning teams play a vital role in ensuring that standards are maintained. The work is technically challenging – the Company recently received the Queen's Award for technological achievement – and tho men and women we are now looking for, will work on very advanced hardware and software using the latest automatic test equipment:

Test and Commissioning Engineers

to carry out fault diagnosis, repair, test, installation and commissioning work on processors, peripherals and microprocessor based controllers. Technical qualifications are desirable although not essential, but previous experience of similar work would be advantageous.

Test Engineers

to carry out test and quality control work at all stages from goods-inwards through to final acceptance testing.

Previous experience of similar work would be valuable.

Salaries are very competitive and other benefits include assistance with relocation where appropriate.

Telephone or write to Keith Helliday, GEC Computers Limited, Eyncourt Road, Ounstable, Bedfordshire. Telephone: Ounstable (0582) 609222 extension 24.

1979 The Queen's Award for Technological Achievement

GEC Computers Limited GEC

CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring David Abbey for further details on 01-261 6018.

LONDON BOROUGH OF BROMLEY

COMPUTER OPERATOR

(Ref. B.303)

C1.1 Salary up to £3309-£3900
(Pay award pending)

Required to assist in operating the Council's ICL 1903T 128K computer. It operates under the George 3 operating system and supports batch processing together with a communications network of VDU and hard copy terminals. Experience of the operating system would be an advantage, although training could be provided.
A minimum age of 19 years applies and trainee operators will be considered.
Closing date: 8th August, 1979.

Application forms from the Assistant Chief Executive (Manpower), Town Hall, Bromley, Kent BR1 1SB. Telephone: 01-464 3333 Ext. 3318.

D.P.M.

W. LONDON **C.8K.**

A management person for a small but forward looking IBM Systems 3, Manufacturing and Commercial Systems exp. Plus RPG11 knowledge.
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1900	**—COBOL GIII**	**IBM**	**—ANALYSTS**
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SYS 1500	**—ASSEMBLER**	**HONEYWELL**	
O.G. NOVA	**—ANAL/PROG**		**—6000 COBOL**

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BLACKWOOD ASSOCIATES

GP House, 155 Hamstead Road, Handsworth
Birmingham B20 2RL
Telephone: 021-523 4520 (24 Hours) or 021-551 2357

			On Target
BIRMINGHAM	Turnkey Computer Systems	Minis	£12,15,000
LONOON	Computer Service Sales	Various	£12-15,000
BIRMINGHAM	V.R.C. sales exp.	Small Systems	£14,000
LONDON	2 yrs. sales exp.	Minis	£15,000

BIRMINGHAM	RPG/COBOL 1/3 yrs.	IBM/Minis	£5,500+
LEICESTER	2 yrs. exp. COBOL	IBM, MVS, TSO	to £6,000
WEST MIDLANDS	COBOL or PLAN	Major ICL	£6,250
WEST BROMWICH	COBOL — On Line	ICL 2956/10	to £5,000
STAFFORD	COBOL Min. 2 yrs.	IBM MVS	£8,000
BIRMINGHAM	1/3 yrs. COBOL On Line	Honeywell	£5,500
LEICESTER	COBOL/RPG 1 yr+	ICL 2960	£6,000

BIRMINGHAM	COBOL/IMS/MVS Cust. Contact	IBM 360/370	£6,000+
RUGBY	2 yrs. exp. COBOL	IBM/MVS/IMS	To £6,000
NOTTINGHAM	2 yrs. COBOL, some Analysis	IBM Minis	£5,500
WORCESTER	COBOL with Analysis	ICL 1900	To £8,500
BIRMINGHAM	COBOL, Team Leadership	ICL 1900	£5,800

ANALYSTS

WALSALL	4 yrs. analysis some prog.	ICL 1900	£8,000
WEST MIDLANDS	Systems exp. some Cobol	Mejor ICL	£6,500
NORTHAMPTON	2 yrs. Prog. 1 yr. Anal.	1900 DME VMEB	£5,500+
COVENTRY	Mlg. systems exp.	Univec 1100	c. £8,000
WORCESTER	Snr. Analyst	Major ICL 1900	To £8,500
BIRMINGHAM	O & M exp. some Cobol	Mejor IBM	£7,100
WEST BROMWICH	Sys. exp. for new systems	ICL 2956/10	£6,000

PROJECT LEADERS

WORCESTER	Project Leadership skills	Mejor 1900	£8,500
BIRMINGHAM	Exp. of Sys. Design	Mainframes/Minis	£6,000+
COVENTRY	Programming Proj. Leader	Univec 1100	£6,700+
BIRMINGHAM	Systems Proj. Leedar	Meinfremes/Minis	£8,000+

+ PLUS + PLUS + PLUS + PLUS +

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PROGRAMMER/ANALYSTS

£5500-£8000

- WHO WISH TO MOVE INTO CONSULTANCY WORK
- WITH A NEW SOFTWARE HOUSE
- EXPERIENCE OF COBOL OR RPG II
- COMMERCIAL APPLICATIONS PACKAGE ASSIGNMENTS
- COMPANY CAR WITH SENIOR POSITIONS

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- 4 YEARS' EXP. WITH PROVEN TRACK RECORD
- FINANCIAL BACKGROUND
- TO DO SYSTEMS DESIGN, TEST AND IMPLEMENT
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Contact: CLIVE CHATTIN (0727) 81373 or write:
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We are looking for nine top salespeople with outstanding track records to grow with this newly formed company, and to grow into its management into the future.

Nexos knows good salespeople need good products to get their teeth into. Earnings will match the talent we want.

This is probably the best ground-floor opportunity the industry has to offer.

If you want to talk about it, send details to Muir Moffat, the Managing Director of Nexos, at the address below:

NEXOS

Nexos Office Systems Ltd., 1-11 Hay Hill, London, W1X 7LF
Tel: 01-408 0797.

Lincolnshire

TREASURER'S DEPARTMENT

Senior Programmer

Your opportunity to acquire a PACKAGE to improve the quality of living:

★ A choice of home in an area which is inexpensive compared with many parts of the country.
★ Living in or near to a beautiful Cathedral City with quick access to the countryside and coast.
★ Earning a salary of up to £8,700 per annum with a notional pay award pending.
★ Generous relocation expenses up to £1,500.

Present equipment is an ICL 1904S with 2904 (real time system link), R + E and 7502 intelligent terminals with replacement mainframe equipment currently under evaluation.

What we require from you is at least 4 years' 1900 programming experience using COBOL, discs, communications and Geo. 3 together with the motivation and enthusiasm to lead, co-ordinate and supervise the activities of a group of young programmers.

For further details of the installation and this key post that awaits the right applicant, telephone LES SANOS of the Computer Division (0522-29931 extension 62).

Application forms and job descriptions are available from the County Personnel Officer, County Offices, Newland, Lincoln (0522-24491) — please quote CT 68/71. Closing date for applications is 10 August 1979.

HAMPSHIRE COUNTY COUNCIL

SENIOR ANALYST/ PROGRAMMER

SO1/2 — £5232-£6060
(pay award pending 1.7.79)

We have a vacancy for a Senior Analyst/Programmer to work within a project team reporting directly to a Project Leader. The Senior Analyst/Programmer's function is to assist in systems analysis and design and to take programming responsibility for the team, supervising and training the other members. Applicants should have at least two years' sound programming experience for this post. Some systems analysis experience would be an advantage.

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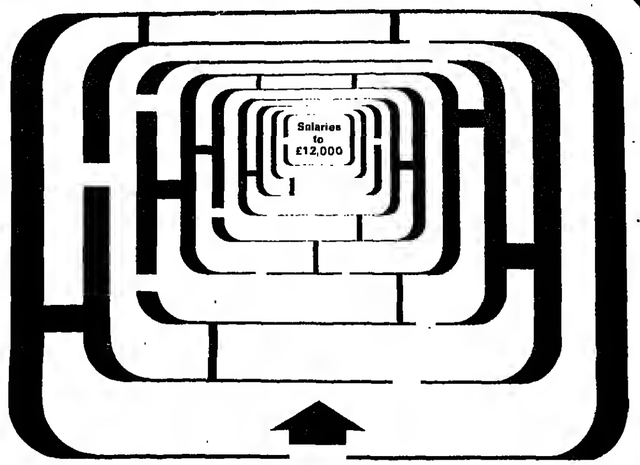

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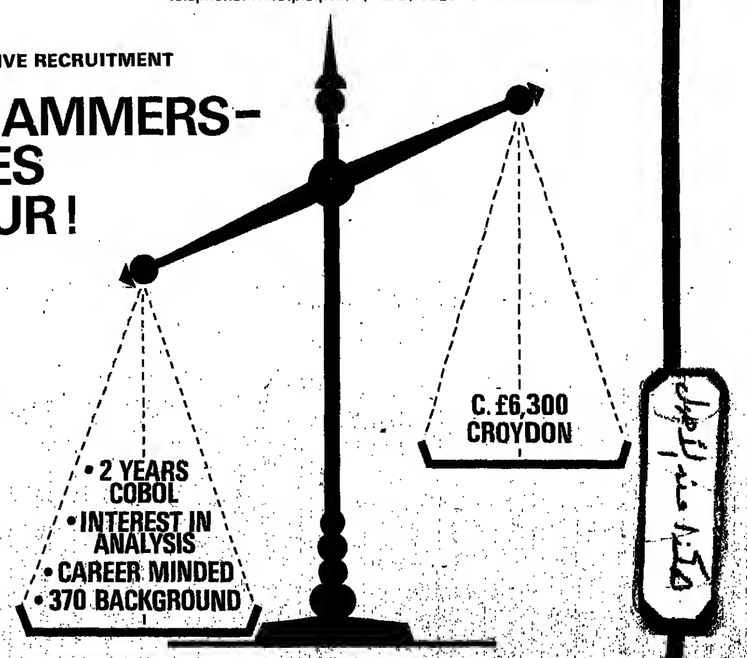

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Please ring Irene on 01-995 4148 for contract details

UCA Recruitment Consultants
UNIVERSAL COMPUTER ASSOCIATES LIMITED
01-995 3883 (01-958 6138 Evenings)
Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick W.4.

Computing Services Association

KNIGHT PROGRAMMING SUPPORT LIMITED

Our client, a large and expanding international company have situated their new installation in a semi-rural part of the Northwest, with easy access to city and country and reasonably priced local properties. They are at present developing an on-line real time system and require System Analysts and COBOL or ASSEMBLER programmers with varying levels of experience.

FOR MORE INFORMATION ON THESE AND OUR OTHER CURRENT VACANCIES PLEASE CONTACT: JOAN JOHNSTONE
143/4 Royal Exchange Buildings, Manchester M2
061-833 9341 (24 hours)
DATA PROCESSING RECRUITMENT SPECIALISTS

MYRIAD

3 NEW ANALYST PROGRAMMER OPPORTUNITIES

CENTRAL LONDON BASED c£8000

Following expansion of our client's computer services department three key positions are now available for people wishing to grow with the department and progress their career within a dynamic and interesting environment. The company, part of a large International group, utilise an IBM 370 mainframe for systems development with the advent of distributed processing in the near future.

ENGINEERING SYSTEMS SUPPORT

This appointment will require candidates to demonstrate around 3 years' sound FORTRAN programming experience ideally gained in an engineering environment.

The person appointed can look forward to providing a programming consultancy service to the engineering group and to leading the development of new programs and installing specific application packages.

COMMERCIAL SYSTEMS DEVELOPMENT

Applicants should possess at least three years' commercial COBOL programming expertise, preferably from an IBM 370/OS environment with some knowledge of financial systems development.

The person appointed will be offerd the opportunity to control total project development and will be expected to perform fully in the analyst programmer role.

ENGINEERING OPERATIONS CONTROL

Ideally candidates will be able to offer on-line experience and COBOL expertise.

Experience of stock control and equipment maintenance systems will be an asset. The position will require the person to become highly involved with the support of the engineering operation and the development of related information systems.

Company benefits are those commensurate with a successful business organisation and each of the positions offers an attractive career prospect for the forward-thinking computer professional.

Ref. NWI/2807

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981 24 HRS.

Today's Computer Operations staff are tomorrows specialists

Today's fast moving computer industry can still offer go-ahead men and women the opportunities to rapidly progress to senior and specialist areas. With such unlimited prospects, computer staff at any level must be ambitious.

Here at GRIP we can offer computer professionals some of today's most exciting futures in the industry, with every opportunity for early career development.

We are the computer services company within the Grand Metropolitan Group, an organisation comprising of some of today's biggest names. Our expansion has been so successful and constant that re-organisation and internal promotions have created a number of real career openings. Here are two positions offering computer professionals the chance to share in our success.

Shift Operations Technician Upwards of £5,250

You will be an ambitious professional looking for the next step in your career – you may already be a high-grade Operator – and should possess substantial IBM experience. This is a challenging role and you will need JCL knowledge. We will give you a thorough technical training on our IBM 3031 and ITEL AS5 mainframe.

Senior Operator Upwards of £5,250

This is an excellent opportunity for someone with proven IBM skills. Opportunities for supervisory experience exists as you will be expected to deputise in the absence of the shift leader. We operate a 3 shift system and our mainframe consists of an IBM 3031 and an ITEL AS5 using OS/VS1 with CMS, and VM and RJ facilities – so VM knowledge would be an advantage.

For the right people benefits are excellent and salaries here are guidelines – whatever you're worth we will match it.

If you see yourself as one of tomorrow's computer specialists contact us today. Miss P. Donoghue, Personnel.
Grandmet Information Processing Ltd.,
Wyvern Way, RockinghamRd.,
Uxbridge, Middx UB8 2UD.
Tel: Uxbridge 58111.

GRIP

the computer power behind Grand Metropolitan

HAWKER SIDDELEY

Brush Switchgear Limited

Systems Analyst

Location: Loughborough, North Leicestershire.

Brush Switchgear Ltd are manufacturers of electrical distribution switchgear of up to 13.8 KV. We are looking for a Systems Analyst to join our small team of Analysts and Programmers who are currently engaged on the conversion from a shared 1904A to our own 80K ICL 2904 computer.

The conversion is scheduled for completion by the end of this year. Next year will see the start of a new systems development programme which will capitalise on the on-line facilities offered by the 2904 running with Telecomputing's TPS software package.

Because of the small size of the team, the work is varied and all aspects of systems development work are encountered. In addition, the use of Telecomputing's Interactive Development System provides the team with powerful on-line development facilities not normally associated with a machine of this size.

The position would therefore suit someone with one or two years computer experience, who would now benefit by joining a small team to broaden his or her experience.

An attractive salary with productivity bonus is offered together with generous company benefits, including the use of outside courses to ensure that the knowledge of the staff is continuously updated and expanded. Relocation expenses would be paid if appropriate.

Interested people are asked to ring either Mike Chislett or Derek Coombes on Loughborough 63131 Ext. 619 for further information or obtain an application form from:-

R. Newton, Personnel Officer Employment,
Brush Switchgear Limited, P.O. Box 19,
Meadow Lane, Loughborough,
Leicestershire LE11 1HL.
Telephone: Loughborough 63131 Ext. 499.

1879 1979

UNIVERSITY CLLEGE LONDON

CHIEF COMPUTER OPERATOR AND SHIFT LEADER

Wanted to work with a challenging new system of several linked GEC 4092 computer plus an IBM 360/65. At least 3 years' suitable experience with either mainframe or mini computers is required, plus an ability and willingness to learn new systems and organise junior staff.

The Chief Computer Operator will be responsible for all aspects of the efficient operation of the machine including the definition of procedures and supervision of staff training. Salary, including London Allowance, will be paid on the scale £5002-£5672 (currently under review).

The Shift Leader, needing a minimum of 3 years' operating experience, is required for a 2 shift rota. Salary including London Allowance and Shift Allowance will be paid on the scale £4303-£5529 (currently under review).

Both positions include over six weeks' annual holiday.

Please write giving details to:
Yvonne Outen, Operations Supervisor
Computer Centre, University College London
17-18 Gordon Street, London WC1H 0AH
or telephone 01-387 0858.

NATURAL ENVIRONMENT RESEARCH COUNCIL

NERC CENTRAL COMPUTING GROUP

ASSISTANT SCIENTIFIC OFFICER

The NERC Central Computing Group has a vacancy for an Assistant Scientific Officer to work at the Rutherford Laboratory, Chilton, near Didcot, Oxon. The post will involve providing general user support for the Univac computer. Specific responsibilities include support of existing major software systems, fault finding and job tracking when problems arise.

Minimum educational qualifications for appointment are 4 GCE O Level passes including English Language and a Scientific/Mathematical subject. Candidates should normally be under 28 years of age on 31st December 1979. Salaries £2 076 p.a. at age 18 rising to £3 990 p.a. at age 21, £3 189 at age 22 rising to £5,619 p.a. (As at 1 August 1979. These scales will be revised in January, 1980)

Daily travel facilities are available from the Rutherford Laboratory to most of the neighbouring towns and villages. Assistance and recreational facilities are provided.

Staff of the Council are not Civil Servants but enjoy pay and conditions of service comparable to Civil Servants.

Application forms may be obtained from Mrs Young at NERC, Polaris House, North Star Avenue, Swindon (Tel. 0793-40101). Completed application forms should be returned by 10th August, 1979.

CITY OF LONDON POLYTECHNIC

COMPUTER SERVICE

The Polytechnic's Computer Services Manager is looking for two more bright young people to join his 20-strong team based in The Minories EC3, close to Fenchurch Street station and within easy reach of Liverpool Street station.

COMPUTER OPERATOR

(ref 79/B4)

The successful candidate for this post will join a team operating at present on a two-shift basis. Preference will be given to applicants who have had operating experience on a large multi-access installation.

Salary: in the range £3048-£4717 including London Weighting plus a shift allowance of £294 p.a. Basic salary and London Weighting both currently under review. Starting point will depend on experience and qualifications.

COMPUTER ASSISTANT

(ref 79/B5)

The successful applicant for this post will perform various support duties to help ensure the smooth running of the Computer Service. A school-leaver with an aptitude for computer work will be considered.

Salary: in the range £2330-£3888 including Weighting). Starting point depending on age, qualifications and experience. The basic salary and the London Weighting elements are under review.

Good conditions for both posts include pension scheme, education and training facilities and annual leave which amounts to 4 weeks and 1 day, plus one additional day each calendar month.

For further details and an application form please apply to the Staff Records Officer, City of London Polytechnic, 117 Houndsditch, London EC3A 7BU, quoting the relevant reference number.

THE UNIVERSITY OF LANCASTER

Applications are invited for the post of **PROGRAMMER in the DEPARTMENT OF COMPUTER STUDIES.**

Experience of the following would be an advantage: PASCAL, machine code programming and/or Data General NOVA software.
Salary in the range £3775-£6366.

Further particulars can be obtained (quoting reference L154/G) from the Establishment Officer, University House, Lancaster LA1 4YW, to whom applications (5 copies) naming three referees, should be sent not later than 27 August, 1979.

CONTRACTS £300 PLUS

London and Home Counties

028 971 2048
24-hr. Ansafone

Operations Specialists

for brand new data centre in Oxford Street

Colgate-Palmolive, the international consumer products company is a fast growing organisation with widely diversified interests and to maintain a high level of operational efficiency throughout our commercial and manufacturing activities we make extensive use of computers in virtually every department.

We're now setting up a data centre based on a brand new Honeywell DPS 100 system with an extensive on-line communications network linking on headquarters with depots and manufacturing plants throughout the U.K.

The establishment of this data centre means that we now need to appoint additional experienced DP personnel to fill the following positions:-

Database Controller

To be responsible to the Operations Manager for formulating and maintaining the efficient structure and content of the database; co-ordinate systems/programming personnel and users with regard to future extensions and assist non-technical users by setting up enquiry facilities over on-line terminals.

The position will call for experience of database design, including a good knowledge of the Honeywell IDS language; familiarity with back-up and security systems for data files, and file management software and operating systems. Good communication skills are essential including an ability to instruct junior staff in data-base techniques.

Network Controller

To maintain in good working order the existing communications network and subsequent extensions in order to provide a continuous service. It will also involve dealing with faults and maintaining close liaison with equipment manufacturers, suppliers and the Post Office in regard to new extensions and fault tracing.

A good knowledge of modern communications equipment and techniques including terminals and modems and associated equipment developments is essential, coupled with an ability to trace faults and liaise with suppliers.

Junior Systems Analyst

To assist the Technical Service Supervisor in achieving optimum computer throughput including assisting in the maintenance and testing of operational systems; maintaining and testing new software modules; assisting programmers and engineers in tracing and curing faults. Other responsibilities will include operator and on-line user training and assisting subscribers in the efficient use of job control language and file management.

It is an exciting new project and the current opportunities for both men and women with relevant skills and experience are, therefore, excellent. Salaries are highly competitive and the benefits attractive including generous discount on a wide range of Group products.

Write with full details of your experience, stating which position interests you, to Mark Parker, Personnel Officer Recruitment, at Colgate-Palmolive Limited, 76 Oxford Street, London W1. Telephone 01-580 2030.

Colgate-Palmolive

MANAGEMENT SERVICES DEPARTMENT

The City Council operates on ICL System 4/50 and a Univac 1109 with terminal network on a two-shift basis. We now require the following staff to work in the operations area:

Computer Operator

£6295-£6788 (under review) Grade AP4 (Ref: MS21)
The successful candidate will preferably be an experienced System 4 operator, but a Univac 1100 or IBM background would be considered. Minimum requirements are 5 'O' levels (including English and Maths) and 3 years' experience in computer operating.

Junior Computer Operator

£4407-£5002 (under review) Grade AP1 (Ref: MS22)
The successful candidate will preferably have at least 5 'O' levels (including Maths and English) or one year's experience of data processing. He/she will also be expected to have a basic understanding of what areas a computer could be used for within a Local Authority.

Both these posts are in a career progression scheme where advancement is based on performance, experience and achievement. Training will be given where appropriate.

There are excellent benefits including:—

— up to 24 days' annual leave, PLUS an extra day off every four weeks
— interest-free annual season ticket loan
— subsidised canteen
— close to Victoria main line, tube and bus terminals

To obtain application form please send postcard, telephone or call at the Personnel Management Division (quoting appropriate reference number), PO Box 240, WESTMINSTER CITY COUNCIL, City Hall, Victoria Street SW1E 6QP, telephone number 01-834 6999 (24-hour ansafone service).
Closing date 9th August, 1979

IBM OS COBOL

LONDON ALL AREAS

c£240 + Exp.

If you are available now or in the next 6 weeks, contact

01-262 2251

PROJECT CO-ORDINATOR

AN EXCITING FUTURE IN THE DEVELOPMENT OF OFFICE COMMUNICATION SYSTEMS!

ITT is a market leader throughout Europe in the field of sophisticated office communication systems. I.D.E.C. was set up to specialise in providing the software expertise for the many different systems. This particular unit specialises in the development of highly sophisticated systems for translating customers requirements onto their hardware.

The job will involve liaising with systems houses and other I.D.E.C. units, upgrading of the Database used by the software production centre, and qualification of the first generation product support system for I.T.T.'s electronic P.A.B.X.

This appointment is based in modern offices in Foots Cray which is on the borders of Kent and London, so offers the nearness of the capital together with the pleasures of the open countryside.

The person they are seeking will have a minimum of three years' experience of computer based projects, be a self starter and preferably have education to degree or H.N.C. level, although somebody with greater experience, without qualifications, would also be of interest.

The science of software production is still in its infancy which means that there are tremendous career opportunities in the field. I.T.T. has a record of past innovation and achievement, present investment in research and development will help fashion the shape of things to come.

This is what the future in communications will mean to you!

- ★ **Starting salary to £7,500.**
- ★ **At least 23 days annual leave.**
- ★ **Discounts on many ITT products such as television sets, sterophonic and audio equipment.**
- ★ **Flexible working hours.**
- ★ **Subsidised staff restaurant.**
- ★ **Relocation expenses.**
- ★ **Modern offices near the countryside.**

IDEC ITT
A Development Centre for ITT Business Systems

To find out more about this opportunity call BASIL PEARCE on 01-439 7871

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB

datascene **01-439 7871**
24 hour answer phone

ICL COBOL PROGRAMMERS

City **to £7000**

We have been retained by several companies operating a range of ICL installations covering all commercial applications who need programming staff at varying levels to continue their expansion programmes.
The benefits offered vary, but many include the valuable SUBSIDISED MORTGAGE.
So if you have a minimum of 12 MONTHS' COBOL experience and are looking for a change, why not give us a call today.

Reference BP 30/1

IBM COBOL PROGRAMMERS

Middlesex **c£6000+5% Mortgage**

A large insurance group operating an IBM 370 installation is seeking several programmers with a minimum of 18 MONTHS' COBOL who are looking for a more dynamic environment where they can utilise and expand on their experience.
The Company offers an extremely good starting salary, £1 a day L.V.'s, non contributory pension, car park, sports club, plus of course the 5% MORTGAGE!!

Reference BP 30/2

SYSTEMS ANALYST

Middlesex **to c£7500**

A large shipping and insurance group is seeking a Systems Analyst to join their small and friendly team, which operates an expanding ICL installation, with a new machine arriving shortly.
The person they are seeking should have approximately three years' analysis experience and possibly a programming background, although this is not essential.
The company offers excellent starting salaries together with extremely good fringe benefits including L.V.'s, season ticket loans, BUPA etc.

01-439 7871 **Reference BP 30/3**

FINANCIAL PROGRAMMER

Midlands **To £6500+BONUS**

A major manufacturer with installations all over the U.K. are currently seeking a programmer to work in their financial software development area.
The ideal applicant will have had a minimum of 2 years' programming experience on financial application within a recognised financial institution such as a Bank or Insurance Company. This is an excellent opportunity for a programmer with either a Mainframe or Mini background to be involved with new developments on Mini's.
The company offer a very good starting salary coupled with various fringe benefits which include a bonus scheme.

Reference HK 30/4

BASIC + PROGRAMMERS

City **to c£7000 + Mortgage**

An International Banking Group require all levels of BASIC+ Programmers to be involved in their new MINI projects.
A minimum of 3 years' experience in BASIC+ is required or, alternatively, good experience in other languages would be considered for people who wish to enter the MINI field.
The Company have several DEC PDP 11 Machines coupled with large IBM Mainframes.
Other attractions include flexi-time, Bonuses, subsidised Mortgages, and loans after 6 months.

Reference HK 30/5

MINI ASSEMBLER PROGRAMMERS

West London **to £7600**

A small but rapidly expanding Software House based in London are currently seeking Assembler Programmers with a commercial background to work in Customer Support role.
If you have around 3 years' Assembler experience on either Mini's or Mainframes and would welcome involvement on a client contact basis then this opening would be of interest.
The Company offers good salary plus paid overtime and the chance to move into Analysis.

01-439 7871 **Reference HK 30/6**

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB

datascene **01-439 7871**
24 hour answer phone

هكذا من الأصل

First Class Opportunities for Experienced Computer Professionals in Nottingham

The Computing Division of the British Railways Board in Nottingham deals with a wide range of batch, on-line and real time projects. Computers used include an ICL 2980, ICL 2960, IBM 370/168, IBM 370/155, mini- and micro-computers.

The present requirement is for computing professionals with at least two years' experience of Cobol programming. There is also a requirement for more senior people especially with experience in IBM Assembler Systems programming or ICL 2900 range.

The commencing salaries will be within the following ranges:-

Programmer	–	£5,230 to £5,819 (Ref. B241)
Senior Programmer and Systems Designer	–	£5,869 to £6,596 (Ref. RB233).
Specialist and Project Leaders	–	£6,518 to £7,450 (Ref. RB163/229)

There is a contributory pension scheme and the transfer of existing pension rights can, in most cases, be accepted. There are also free and reduced-rate rail travel facilities.

Applications stating age, education, qualifications and experience should be sent to:-

Headquarters Staff & Services Manager, British Railways Board, 222 Marylebone Road, London NW1 6JJ. quoting the above appropriate reference number.

Computer Operator

A progressive career in Bracknell

We operate an H64/20 with communications under GCOS on a 2-shift system using disc, tape and the output from a Redifon Seecheck system.

We need an operator with at least a year's experience on the above installation to join our team providing a service to the Clark Eaton group – leading flat glass merchants, glazing contractors and glass processors. PM 200 knowledge would be a distinct advantage.

To find out more details on the job and salary offered, call Vincent Murphy, Personnel Manager on Bracknell (0344) 24733 or write to him at James Clark & Eaton Limited, PO Box 18, Southern Industrial Area, Bracknell, Berkshire RG12 4UU.

CLARK

MYRIAD

SYSTEMS ANALYSTS

SW LONDON **£8000-£9500**

Having recently made a substantial investment in new hardware our client is now seeking two Systems Analysts to play a prominent part in the Company's new development program. These positions present an outstanding opportunity for experienced analysts to gain total systems experience with the prospect of progression to project management utilising advanced equipment and communications techniques.

One Analyst will initially have responsibility for developing a multi-Company Nominal Ledger system for subsidiary companies throughout the UK and overseas. The other Analyst will be involved with the feasibility of a new system to provide management with profitability and marketing statistics

Applicants should be experienced analysts with knowledge of financial applications seeking greater challenge and a rewarding career in one of the foremost installations in the country. Used to working to high standards the successful candidates will enjoy functioning in user oriented situations and be capable of leading project teams.

Conditions of employment are excellent and accompanied by a range of large company fringe benefits.

Ref. E1/2607

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants
Telephone or write to:- 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)

Analyst/Programmer for a new Computer Team

Cheltenham Spa Around £6,000 plus relocation.

Endsleigh is the U.K. subsidiary of a prestigious insurance group based in the Netherlands. Formed in 1965, the company now holds a leading position in the student and academic market with over 50 insurance centres throughout the country.

We have recently installed an IBM System 34 computer, and we are now in the process of building up our computer team. It is a young, dynamic environment and we are already making plans to install an IBM System 38 in order to meet our ambitious computer development plan.

The successful applicant will play an important role in the development of our computer systems, and should have around five years experience in Data Processing with at least two of those spent in detailed analysis work.

The ideal candidate will have a sound commercial background preferably in the insurance industry, and should have experience of high level computer languages, particularly RPG II. Some experience of IBM GSD would also be extremely useful.

The company has an innovative approach to insurance, coupled with a highly progressive attitude to staff conditions. In addition to a negotiable salary, benefits include free pension, life assurance and permanent health insurance schemes and an attractive modern environment.

If you think you can make a contribution to a successful young company, then write to our assistant Personnel Manager, Alan Marry and tell him why.

Endsleigh

Endsleigh Insurance Services Ltd., Endsleigh House, Cheltenham Spa, Gloucestershire GL50 3NR. Tel: Cheltenham (0242) 35161.

OEM SERVICE SUPPORT MANAGER

c. £7,500 + estate car + pension + P.P.P.

An established manufacturer of Magnetic media peripheral equipment is opening a direct U.K. and Scandinavian Marketing Office and requires a Service Manager.

This is an excellent ground floor opportunity for a person of proven service capability to mini computer peripherals. The ability to conduct training courses would be an advantage.

A good career progression and excellent total remuneration package will be offered to the right person.

Location will be Berkshire.

Please reply to Box 1041, Computer Weekly.

FIELD SERVICE ENGINEERS

£6,000 + O.T. + QUALITY CAR

Fabulous opportunity to join a leading manufacturer of a wide range of prestige mini computers and peripherals. Excellent prospects include above average growth (43% increase in turnover plus two new branch offices plus 21 new product launches, all in the last year). Helpful friendly young management

Basic salary £6,000 plus overtime plus car plus training. If you are ambitious, feel capable of assuming responsibility, why not take that all-important step forward — if living in London or Home Counties, call us today, but hurry . . .

Ref. EK2014.

AB EXECUTIVE (KINGSTON) LTD. 01-549 6442

Rank Strand Electric require a Software Engineer

Rank Strand Electric through their U.K. base and associated overseas companies are the world leaders in theatre and T.V. lighting and control equipment. Mini-computers and micro-processors are already extensively used in the current product range, extending from *simple 6800-based to multi-processor arrays* hosted by a PDP 11/34.

To support this equipment and to develop new products, taking advantage of the next generation of micro-processors now becoming available, we need a Software Engineer to strengthen our team. The ideal person would have 2 or more years' experience in programming mini of micro-computers in assembly language for real-time applications, and experience in systems design and analysis. A good grasp of the technology and interfacing methods of micro-processor systems is required, as is the ability to liaise easily with electronics and system engineers ensuring rapid and successful development programmes.

A general education to degree standard, or less but with experience in lieu, is expected. This post is open to both men and women.

Normal large company benefits apply, with subsidised canteen and social club.

For further details and an application form please write or telephone Mrs. Hutchings, Senior Personnel Officer, Rank Strand Electric, PO Box 70, Great West Road, Brentford, Middlesex. (Telephone 01-568 9222).

RANK STRAND ELECTRIC

ASSISTANT TO COMPUTER OPERATIONS SUPERVISOR

c. £5200

Due to expansion a position has arisen in the In-House Computer Department of our new H.O. building administration offices for an experienced Computer Operator to assist the Computer Operations Supervisor.

The successful applicant, aged 22 or over, will have had one year's disk experience, preferably including NIXDORF equipment and will have a responsible outlook to his/her work.

Working in an installation including NIXDORF/DEC PDP11 and DATAPOINT Equipment, the main function will be to correctly process daily work schedule as supplied.

Basic hours of duty will be from 12 noon to 8.00 p.m. Monday to Friday, which will require an ability to work on own initiative.

As well as a good starting salary, we offer excellent working conditions, pension, life assurance, discount schemes, an excellent subsidised staff restaurant and a planned first-class social club.

For application form please apply Mrs. S. Parker, Staff Personnel Officer, Charrington and Company Limited, Anchor House, 15/19 Bell Road, London E1 4UL. Telephone: 01-790 1260.

Charrington

after your holiday....

...why not a NEW CAR and a NEW CAREER

THE COMPANY are a household name and world leaders in their field. Their European headquarters are loceted in e brand new modern building situated in the western home counties and easily accessible both from London and more rural areas via the M3 and M4 motorways and convenient to a main line railway station. Our client's outstanding success is the combination of a highly professional, young management team coupled with an aggressive, innovative marketing image, backed by first class support from their computer systems area. A large IBM mainframe forms the base for the development of a number of on-line systems including a large overseas on-line network.

Due to increasing new development work the following three vacancies occur

SYSTEMS ANALYST — to £7,400 + Car

At least two years of systems design and implementation, coupled with a flexible approach and the ability to "think on your feet" could gain you a key position in one of our clients project teams developing systems on a European basis.

QUALITY ASSURANCE ANALYST — to £6,700 + Car

This new position within an independent standards and assurance function may suit Analysts or Programmers wishing to move into the expanding and challenging field of compufer audit.

You will require 4 years + COBOL experience gained in an IBM OS environment coupled with the ability to contribute towards the development and subsequent auditing of standards and procedures in the field of program development.

LEAD PROGRAMMER — to £6,700 + Car

This position will require 4 years plus COBOL experience gained in an IBM OS environment, coupled with the ability to lead a team of programmers and be involved with the initial design of systems. As our clients will offer you involvement with mini-computers, real-time experience would be a decided asset.

THE REWARDS are practically unbeatable and, in addition to a competitive salary and company car, will include free BUPA, non-contributory pension and superb working conditions.

So give yourself something to look forward to after your summer holiday and contact REX SCOONES at our Croydon office for full details on the company and the vacancies.

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF. CW161-9S

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS

CAPP ASSOCIATES LONDON AND MANCHESTER

Computing Services Association

01-686 9693
A.M.P. HOUSE, DINGWALL RD., CROYDON, CR9 2AU

Computer Servicing Saudi Arabia £16,350

If you have a C & G (or Service equivalent) plus five years' field or laboratory maintenance experience we can offer you an attractive two year contract including:

At least £16,350 tax free per contract.

Three paid leave periods annually with three free flights home to the UK.

Free bachelor accommodation, food and laundry.

Free medical care and life assurance.

Fill in the coupon with details of experience and send to the Senior Recruitment Executive (Lockheed), IAL, Personnel Consultancy, Aeradio House, Hayes Road, Southall, Middlesex. Telephone: 01-574 5000.

Name:
Address:
Tel:
Experience:

IAL

Ref. 319.

MANAGER COMPUTER INFORMATION

CITY OF LONDON up to £8000

We have been asked to recruit a well-educated person who has an orderly mind, has new ideas and enjoys taking the initiative as well as providing a really good service.

Our clients are an international manufacturing and marketing group whose management consultancy division maintains a Computer Information Centre to support its computer consultants and operating companies throughout the world.

Candidates should have:

- a good general knowledge of computers, hardware, software and their applications
- the ability to communicate well and write succinctly
- some previous business or analysis and programming experience

The company provides good terms of employment; a range of opportunities for career advancement and the chance to work in a friendly group of D.P. professionals in well-appointed offices.

For further details please ring us or write briefly quoting reference 773W. Messages will be recorded outside normal hours.

EDP SYSTEMS LTD
52-53 Margaret Street, London W1N 7FF
Telephone 01.637 5796 (24 hours)

UNIVERSITY OF NEWCASTLE UPON TYNE
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

COMPUTER AIDED DESIGN OF V.L.S.I. SYSTEMS

Applications are invited from graduates with a good honours degree in Electronic Engineering or Computer Science to work on a project involving the evaluation and improvement of design aids for V.L.S.I. The department will have a colour graphics system exclusively for this project including a high resolution display and four colour plotter linked to the University's main frame computer.

This work itself will be carried out in collaboration with industry to develop aids to interactive layout, simulation and the management of the complex design problems associated with the next generation of integrated circuits.

Posts are available as follows

1. Research Associate 1A (4,333-£7,521 p.a.) starting at a point not higher than £4,910 for a period of two and a half years from 1st October 1979, with membership of the appropriate University superannuation scheme.
2. S.R.C. CASE award Studentship in collaboration with the Plessey Company Limited

There will be opportunities for travel both in this country and abroad in connection with the project.

Further information is available from Professor D. J. Kinniment, Department of Electrical and Electronic Engineering, The University, Newcastle upon Tyne NE1 7RU, telephone 0632 28611 ext 3338, with whom applications (3 copies) together with the names and addresses of 3 referees, should be lodged not later than 14th August, 1979.

Please quote reference CW

Western Australian Institute of Technology
School of Business & Administration

DEPARTMENT OF COMPUTING AND QUANTITATIVE STUDIES
(Permanent Appointments)

Lecturer in SYSTEMS DESIGN
(Salary range £sig8,237 — £stg10,821)
19th July Exchange Rate)

The lecturer in Systems Design is required to teach and develop subjects and courses in both batch and real-time systems design; the structured approach to analysis, design and programming; file structuring techniques including data base; data base design alternatives; system security; on-line data entry; information retrieval; and high level languages, in particular COBOL. (Ref. No. 225)

Lecturer in COMPUTERWARE
(Salary range £sig8,237 — £sig10,821)
19th July Exchange Rate)

The lecturer in Computerwera is required to teach and develop subjects and courses in computar hardware including large main frames, peripherals, minis, micros and world processing; computer software, including operating systems and utilities; programming languages including macro ASSEMBLER, FORTRAN and BASIC; contemporary developments in hardwera and software and their particular application in business date processing. (Ref. No. 226)

Qualifications: Applicants for permanent lecturer positions should have a first degree as well as sterable relevant experience and an ability to communicate in a teaching situation at the tertiary level. Evidence of capacity for self development is desirable.

Conditions include: Fares for appointee and family plus some assistance for removal expenses. Superannuation is available for staff with permanent tenure. The positions are permanent; however the Institute is interested in receiving applications from persons preferring a limited term (1 - 3 years) appointment. Return fares are provided for staff appointed for a limited term.

Applications: Details including the names, position titles, and addresses of three referees should be submitted not later than 24th August 1979 to the Migration Liaison Officer, Western Australia House, 115 Strand, London WC2 0AJ, England. A brochure containing further information may be obtained from the above address.

When applying please quote position reference number and the media code CWS

---

ata Computer Recruitment

A division of ATA Selection and Management Services, recruitment consultants to industry and commerce since 1962

Our client is a major International Group of Civil Engineering Consultants and Architects, based in West London. They offer an excellent fringe benefit package which includes:

1) Free Life Assurance
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PROGRAMMERS
£6,000

Using Fortran on Prime Mini Computers. The duties include liaison with computer users, maintenance of Software and the maximum utilization of the Hardware Systems. The successful applicant possessing a scientific degree or HND in computer studies and at least 2 years' computing experience.

ENGINEER/PROGRAMMERS
c £4,750 at 23

Holders of BSc and HND Civil Engineering with computer programming experience, are required to assist in the implementation of computer systems, advising Engineers on the selection and use of computer programs to solve engineering problems.

For further details telephone Lindsey Lee, 01-637 0781

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Computer Professionals

To meet an ever increasing workload our client, a large scale data processing installation based on the Eastern side of Birmingham, is looking for experienced operations staff. The system to be operated is VME/B on an ICL 2976 and a full range of peripherals is supported including offline OCR machine and graph plotter. There is also an extensive communications network serving RJE and MAC.

Senior Computer Operators

Earnings up to £3,750 (including shift allowance) Ref. AK1

Required to help the shift leaders in the efficient running of the Computer Room and will often have total control of daily operations for significant periods. Applicants should have a minimum of three years' experience of a large computer system including some at a senior level. A three shift rotating (weekly) system covering the hours 23.00 Sunday to 19.00 Friday.

Computer Operators

Earnings up to £4,700 (including shift allowance) Ref. AK2

Working under the direction of the Senior Operators applicants should have a minimum of 1½ years' experience of a large computer system. All operators will be expected to work a three shift rotating (weekly) system covering the hours 23.00 Sunday to 19.00 Friday.

Operations Analyst — Commercial

Salary up to £6,100. Ref. AK3

Responsible for the successful acceptance and subsequent implementation of any new systems/systems changes ensuring all operational criteria and deadlines are met. The Analyst is also responsible for the running of all necessary acceptance tests, liaising internal and divisional operations staff to run new systems and supporting all operations activities during the initial live runs of the system.

Candidates should have an appreciation of operational problems and/or an operational background and have experience in supporting remote users. They should also have the ability to work with minimal supervision and be able to liaise effectively with senior members of other sections of the Data Processing Department.

The Data Processing Installation is housed in a modern office block and all jobs offer opportunities for promotion and career development. The conditions of service are excellent and a substantial salary award is currently being negotiated.

Please apply in writing to Position Number ABC594 Austin Knight Limited, Trieorn House, 31-33 Hagley Road, Edgbaston, Birmingham B16 8TP, quoting appropriate job reference number.

Applications are forwarded to the Client concerned, therefore Companies in which you are not interested should be listed in a covering letter to the Position Number Supervisor.

Closing date: 7th August, 1979.

AK ADVERTISING

As a result of the acquisition of a new Honeywell Level 64 computer, Franklin Mint Ltd., the U.K. division of the world's largest private mint, are seeking to recruit a:

COMPUTER OPERATOR
£4,650 (including shift allowance)

We operate an attractive shift system which entails working only 3 shifts per week for two out of every three weeks.

Applicants should ideally have a minimum of 12 months' experience operating either a Honeywell Level 64 or Level 66 operating under GCOS. Alternatively we would accept experience of any medium/large IBM main frame system.

In addition to the salary, we operate a non-contributory pension scheme, free life and permanent health insurance, free BUPA and give L.V.s, a maximum of 20 days' holiday and a non-contractual bonus.

We will be commencing interviewing in the very near future, so if you are interested, please telephone Peter Brown now on 01-697 8121 or write to him at the address below.

Franklin Mint Ltd.
138 Bromley Road
London SE6 2XG

SERVICE ENGINEER COMPUTER PERIPHERALS —LONDON BASED

We need another field service engineer to look after our range of computer peripheral equipment. The person appointed will live within easy travelling range of central London, have some field service experience, possess a sound knowledge of electronics, preferably related to computer peripherals and processors, be prepared to work mainly in the central London area and occasionally throughout the UK. A company car is provided. A full product training will be given on our range of vdu's, matrix and spark printers, mag-tape and floppy disc stores and drives.

Write or telephone for an interview to:
Lon Knott at the address below.

Penny & Giles Data Recorders Ltd
Mudeford Christchurch Dorset
Telephone: Highcliffe (042 52) 71511

SAGITTA
Computer Systems and Staff Recruitment Consultants
urgently need

PROGRAMMERS
(2 years Cobol). For New York
Phone (reverse charges)
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PROGRAMMER/ ANALYSTS
Available

£6 per hour
Or fixed price

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CONTACT US, THE SPECIALISTS IN THERE FIELDS

We urgently require Programmers with experience of Fortran, Assembler, Coral or Basic for Real-time Applications.

Jobs from £3,500 to £8,000 in all areas. Phone now for a free list of vacancies.

Capital Appointments, 29-30 Windmill Street, London W1
Telephone: 01-637 6561 (day) — 01-636 9692 (eves)

PROGRAMMER
W. MIDLANDS

Bristol operation requires an additional programmer with:

- two years' plus COBOL
- D.P. knowledge and basic business o.p.

Salary c £4,500
(+ car, expenses)

Tel: Worcester 427077
Dan Knaggs

OPPORTUNITIES IN SCOTLAND

D M L have been retained by various major installations in Scotland to relocate experienced computer staff throughout the U.K.

Current vacancies we are handling cover:
IBM ON-LINE SPECIALISTS (CICS/ASSEMBLER), SYSTEMS ANALYSTS, ANALYSTS/PROGRAMMERS, SUPPORT ANALYSTS (MINI COMPUTERS), SENIOR CONSULTANTS (SOFTWARE HOUSE), PROJECT LEADERS, SENIOR SYSTEMS ANALYSTS.

In all cases salaries are competitive and some vacancies offer fringe benefits e.g. mortgage subsidies, company car, etc.

If you are interested in moving to Scotland, then telephone Phillip Bise to discuss the possibilities on 031-226 6874 or write to: D M L Computer Personnel Service, 11 Charlotte Square, Edinburgh EH2 4AR.

LOCATION INTERVIEWS WILL BE CARRIED OUT IN MAJOR CENTRES THROUGHOUT THE U.K.

THE UNIVERSITY OF SHEFFIELD

Applications are invited from BSc or equivalent graduates for a post of

PROGRAMMER/ SENIOR PROGRAMMER

Please read this

We at CMG cannot understand why you have not applied to us yet for a job.

Perhaps you see our ads so often that you have stopped reading them

We do advertise frequently but we do need a lot more people to achieve the £6,000,000 of growth planned for this year.

Perhaps you do not want to work in the service industry

The Service Industry is different and you either love it or hate it. We love it – perhaps you would.

Perhaps you do not believe the high salaries that we offer

Independent surveys have consistently shown that our staff are amongst the highest paid in the industry.

Perhaps you are not sure whether your experience is relevant to our needs

We require computer professionals with a minimum of 2 years' commercial systems and programming experience. At the top end of our scales we are looking for solid consultancy and management experience as well. We have a wide range of salaries (£5,000 to £11,000) because we have a wide range of requirements.

Perhaps you are uncertain of what we can offer you

We offer a wide variety of challenging work from programming through to consultancy. We work with minis and mainframes and with a variety of customers and applications. All promotion is from within and is based purely on ability. Our commitment to growth ensures excellent promotion opportunities. The CMG atmosphere is both professional and informal and everyone is encouraged to participate in the affairs of the company. There are profit-sharing and share-purchase schemes.

Perhaps we will hear from you soon

If you would like more details please telephone either of the numbers below or write for an application form to:-

Brian Walters,
Managing Director,
CMG (West End) Ltd., Telford House,
14 Tothill Street, London, SW1H 9NE.
Tel: 01-222 3521.

Cliff Luff,
Managing Director,
CMG (Middlesex) Ltd., Westway House,
320 Ruislip Road East,
Greenford, Middlesex.
Tel: 01-578 4563.

CMG
Computer Systems for Business

Recruitment LOGISTIX in Informatics

Message Switching & Communications France

Salary: to £17K

A prestige German client wishes to expand and establish a small specialist project team working in the areas of Data Communications and Packet/Message Switching. This is a very rare opportunity to enhance your career by extending your social horizons and developing State-of-the-Art D.P. technology whilst having the benefit of living in a country where there is little D.P. recruitment for U.K. nationals. Successful candidates will be either graduates (Computer Science or Maths) or have in-depth knowledge in advanced computer applications. You will probably be employed as a Systems Designer or Software Programmer in a Mini-computer environment with extensive Assembler experience. Those candidates who have a working knowledge of either French or German will be especially welcome. Ref: A/26/07

PL-1 Programmers City of London

Salary: to £9K + package

A "blue chip" International financial institution based in The Square Mile is expanding its team members and consequently requires PL-I Programmers and Analysts/Programmers. Ideally you should offer 18 months experience of PL-I applications under OS/VS I or VS II and preferably have recent involvement in either teleprocessing or Data-Base techniques. Of particular importance is the ability to work as a member of a specialist project team under strict documentation and programming standards. A second programming language (COBOL or Assembler) would be considered advantageous particularly for forthcoming distributed processing developments. Our client offers a subsidised mortgage, personal loan scheme, excellent pension and health schemes. Interviews will be held in London in early August. Ref: B/26/07

Cobol Programmers Middle East

Salary: £16K (Tax Free)

A recently opened subsidiary of a Scandinavian Computer Services organisation requires top flight COBOL Programmers. Particular hardware or applications experience is not important but recent experience of either IBM or ICL machines is most useful. You will relocate (either on a married or single basis) to one of the better Middle East locations which offers considerable social and holiday attractions on a par with those found in Europe. In addition to a tax free salary, you will be provided with excellent free accommodation and a car allowance whilst the holiday entitlement amounts to half yearly and yearly paid air tickets to the country of origin. We will be holding first interviews in London after which the client will conduct a final session by the end of August. For expatriate candidates, we will be happy to accept a detailed resume. Ref: C/26/07

Cobol Programmers West London

Salary: £5.5-£7K

Our client, a U.S. multinational corporation who are leaders in their field, are about to install sophisticated E Series IBM hardware. As a result of this expansion they require COBOL Programmers with 2-4 years experience to work on the implementation of a new distributed processing network. Training will be given in on-line/Real-Time applications and projects will include stock control, order processing, payroll and financial systems etc. This is an excellent opportunity for candidates to gain experience in the implementation of a new system or for those wanting to progress into the area of Systems Analysis and to develop their skills in the areas of T.P. and Database applications. Additional to above average salaries, benefits include 4 weeks holiday, free BUPA, staff restaurant and Life Insurance scheme. Interviews will be held within the next two weeks and offers will be made within 7 days thereafter. Ref: D/26/07

Analysts + Programmers London + Manchester

Salaries: £6—10K

Our client is a major international company recognised as market-leaders in its field and has retained Logistix to assist in recruiting the following key project-team specialists: Real-time Mini-Programmers, Database Designers, Compiler Specialists, Communications Experts (Mini and Mainframe), Applications and Software Programmers. Experience of any of the following will be especially welcome: RSX II, RTL II, BASIC, ASSEMBLER, PL/1, COBOL, IMS or other D.B. For those who enjoy overseas travel, there will be ample opportunity to visit European and Middle-East locations at which our clients have offices. Successful applicants are likely to demonstrate qualities of leadership potential, determination, and be self-starters. It is anticipated that you will achieve very rapid promotion with this prestigious company. Interviews will be held in London and Manchester during August. Ref: E/26/07

Logistix, Freepost 32, London WIE 3YZ

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The locations are throughout the U.K., Europe, the Middle East and North America.

And the salaries?

If you can supply the experience, and of course the ability, we can supply the jobs, with the kind of salaries you are worth

We do not have the space here to list the scores of opportunities we have on our books but whether you have been working for twelve months or twelve years we would like to hear from you.

And we think you will like what we have to say in return.

Write or telephone today. 24 hour answering service.

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9–11 Tatton Street Knutsford Cheshire WA16 8AB Tel: 0565 4925

30 Baker Street London W1M 2DS

What would it take to shake you out of your cosy software house?

Well, prepare to have your answers gently twisted.

Having landed a plum job in a good software house, you're certainly going to need some persuasion before you move.

How would you like the idea of hands-on involvement in micros and minis that are the basis of some of the most complex real-time systems in the world?

Imagine working in an environment where growth is so fast that you'd have to adjust to new and wider career horizons in months, rather than years.

Picture yourself leading a team – up to 10 strong – of talented, intelligent, individualistic, obstinate programmers – all closely involved in systems definition.

Tempting isn't it? Men and women, a quick phone call to Chris Hill on 01-953 2030, extension 3449, will do a lot to satisfy your curiosity – especially about those salaries – up to £9000 for the right people.

But a word of caution. With what he's got to tell you, you could end up feeling decidedly shaken.

Not to mention stirred.

Marconi Avionics Limited, Elstree Way, Borehamwood, Herts.

Alternatively call 01-207 3455 anytime (day or night) and we'll send you more information.

Please quote reference MA 79127.

MARCONI AVIONICS

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HAWKER SIDDELEY
Brush Electrical Machines Ltd

Computer Programmers

We have vacancies for two Computer Programmers. Ideally applicants should have knowledge and practical experience of commercial programming particularly in COBOL, or a degree in computer science. However we will consider applications from graduates in other preferably related disciplines who can demonstrate a keen interest in a career in computers.

We offer an attractive salary coupled with conditions commensurate with a large and successful company.

Please contact Mr. D. G. Dewick, Assistent Personnel Officer, Brush Electrical Machines Limited, P.O. Box 18, Falcon Works, Loughborough, Leicestershire. Telephone Loughborough 63131 ext. 64.

Experienced Computer Operator

A Computer Operator with a minimum of 18 months experience is required for our Data Processing Department.

The successful applicant will have had experience of operating a computer and peripheral equipment similar to that in our installation.

Our current hardware configuration consists of a 128K I.B.M. System 3/15D and an I.B.M. 64K System 34. The system 34 is being extended to handle both local and remote terminals for real time processing.

We are looking for an operator who wishes to widen his or her experience in computer operations and play an important role in the development of our Data Processing Department.

Interested applicants should apply in writing to: Ina Clanahan, Playtex Limited, Playtex Park, Industrial Estate, Port Glasgow.

playtex LIMITED

Western Australian Institute of Technology
School of Business & Administration

DEPARTMENT OF
COMPUTING AND QUANTITATIVE STUDIES
(Limited Term Appointments)

(£stg8,237 — £stg10,821) (9th July Exchange Rate)

Lecturer in MANAGEMENT INFORMATION SYSTEMS

A Systems Analyst, Business Analyst, Accountant or Manager, with wide experience in the application of computer based technology is required to assist in teaching subjects related to the 'user' aspects of computer systems, computer applications in business and the theory and practice of management information evaluation. (Ref. No. 227)

Lecturer in SYSTEMS DEVELOPMENT

A Project Leader or Analyst Programmer with extensive experience in the development and implementation of commercial computer systems, on large main frames and/or mini computers, is required to assist in teaching the tasks and techniques of systems development, file design principles and high level programming languages, in particular, COBOL. (Ref. No. 228)

(£stg7,099 — £stg8,133) (9th July Exchange Rate)

Senior Tutor in COMMERCIAL DATA PROCESSING

A programmer with extensive experience in COBOL programming, preferably developed using structured techniques, is required to teach programming concepts using high level languages. Applicants should also have some experience in a range of computer hardware configurations and/or other high or low level languages. (Ref. No. 229)

Senior Tutor in QUANTITATIVE ASPECTS OF BUSINESS

A graduate with qualifications and experience in the application of quantitative techniques in a business environment is required to teach business mathematics and statistics, management science techniques or operations research. Applicants should have hands on experience with computer terminal operation and be familiar with at least one programming language, preferably BASIC. (Ref. No. 230)

Qualifications: Applicants for lecturer positions should have a first degree and extensive relevant experience. Senior tutor should have a first degree and some relevant experience. It is desirable that applicants for all positions can demonstrate an ability to communicate in a tertiary level teaching situation.

Term: Contracts of 1 - 3 years duration will be negotiated with each successful applicant.

Conditions include: Return airfares are provided for appointees and their families together with some assistance for removal expenses

Applications: Details including the names, position titles and addresses of three referees, should be submitted not later than 24th August 1979 to the Migration Liaison Officer, Western Australia House, 115 Strand, London WC2 0AJ, England. A brochure containing further information may be obtained from the above address.

When applying, please quote position reference number and the following media code CW5

GLASGOW COLLEGE of TECHNOLOGY

The Glasgow College of Technology, a major polytechnic institution of higher education, invites applications for the following post.

SYSTEMS ANALYSIS AND DESIGN OR COMPUTER SCIENCE

LECTURER 'A'

for a computing professional to join the staff of the Department of Computer Studies and make a significant contribution to the teaching and further development of his/her specialism at higher diploma and degree level. Applicants should be suitably qualified and experienced graduates specialising in either Systems Analysis and Design or Computer Science.

Salary Scale:
Lecturer 'A' **£4464-£7821 (Bar)-£8397**

Placing on the salary scale will be given for relevant experience.

Forms of application and further particulars can be obtained from the Establishments Officer, Glasgow College of Technology, Cowcaddens Road, Glasgow G4 0BA, and should be returned within 14 days of the appearance of this advertisement.

Edward Miller, Director of Education
STRATHCLYDE REGIONAL COUNCIL

Strathclyde Department of Education

Programmer

BP Nutrition (UK) is a successful and expanding company in the field of animal nutrition and related products

We are expanding our successful Cheshire based advisory service which provides customers with a wide range of information on balanced diets and livestock production using a Data General Computer

We are seeking a Programmer to undertake the development of new software particularly in the area of modelling livestock production.

We are seeking applicants with an 'A' level education or above and two years' experience of Fortran and systems analysis, including modelling.

The Company offers an attractive salary on a rising scale based upon merit, a non-contributory pension scheme, excellent lunches and assistance with relocation expenses.

If you would like to be considered for this post, would you please write giving previous qualifications and experience to:

Personnel Officer, BP Nutrition (UK) Limited, Stapfield, Witham, Essex.

BP nutrition BP

Southwark

Progress!

in our new Computer Centre

Does your commitment match ours? — if it does then you will need to join us by taking on a wide range of VME/B systems, using a new 2MB ICL2970 in a brand new Centre

We believe that makes us the place to be in 1980.

So help your progression now!

Operations Manager

up to £8600* plus car allowance and up to £1000 relocation expenses.
Ref. CW/8/9532.

Responsible to the Computer Centre Manager for all the aspects of the daily Computer operation and leading your team in further wide ranging development work.

Senior Operator

up to £5200* plus O/T (two shifts)
Ref. CW/8/9533.

If you know the ICL 2900 well, then this is your opportunity to progress and we will give you every encouragement in your career.

We are a young friendly team with good social facilities and the full range of Local Government benefits including generous holidays, excellent staff canteen, pension and sickness schemes.

*Salary under review.

If you would like to know more or to arrange an informal talk, please ring Geoff Steggels on 01-703 6311 Extension 185, or ring 01-701 2870 any time (24-hour answering service) for an application form.

Please quote Reference Number and Job Title. Closing date. 14.8.79.

UNIVAC 1100 SENIOR OPERATORS

G.S.I'S European Centre at Slough has an expanding 1100 configuration including 20 x 8434, 5 x 8433 and 5 x U16 operating in a TIP/DMS environment, hosting a large communications network.

To strengthen current operations, experienced top-grade staff are required as Senior Computer Operators.

Salaries will be in the range of £4700 p.a. to £5700 p.e. including shift allowances.

For further information please write to, or telephone, ALAN HUTCHBY at:

750 DEAL WAY, SLOUGH. TELEPHONE SLOUGH 37011

CITY OF SHEFFIELD
City Treasury
Computer Services Division

ASSISTANT SYSTEMS AND PROGRAMMING MANAGER

PIIh - £7802 - £8349 (including supplement)

Should be suitably experienced and qualified persons for this senior post. The Computer Services Division is comprised of 103 staff, of whom 32 are attached to the Systems and Programming Section. The City Council is to replace its ICL 1904S (192k) computer by an ICL 2960 (2 Mb) in November 1979 followed by an ICL 2972 (4 Mb) in January 1981. The successful applicant will be expected to play an important part in the conversion of existing systems and the development of a comprehensive manpower information/payroll system during this period. Further development will be orientated towards a data base concept for which this officer will have special responsibility.

Applications, giving details of qualifications and experience, together with the names of two referees, should be sent to the Chief Personnel Officer, Palatine Chambers, Pinstone Street, Sheffield S1 2HN by the 31st July.

SOUTHERN ENTERPRISE!

North Hants.	Team Leader (Mini)	c £7,500 + car
Woking	Analyst (ICL)	c £7,000
Guildford	Operator (ICL) days	£4,200
Guildford	Analyst (IBM)	c £7,000
Guildford	Programmer (IBM)	c £6,000
Farnborough	Consultant (Systems House)	£7,500 +
Camberley	Or Analyst (User)	c £6,000

These are but a few of the 100+ vacancies that we are currently seeking to fill.

BOB WILLIAMS KNOWS THE SOUTHERN MARKET and can be *relied upon to arrange interesting and relevant interviews.*

Telephone today! for an early interview.

Management Personnel
2 Tunsgate Guildford Surrey
GUILDFORD (0483) 66566

Analysts and Programmers

Come to the West Country where you and your family will have the time to live.

Systems Analysts £7500

Systems Programmers £7300

COBOL Programmers £7000

Our Client, based in the West Country and a leading manufacturer of a range of high technology products, is expanding rapidly. With several years' experience of using computers in production control and related applications, they now require experienced computer professionals to join them with the ability and drive to work with the latest techniques in data processing.

Major developments include the extension of existing on-line systems, progressive expansion of the Company's IMS data bases and the installation of a 4 megabyte IBM 4341. Programmers should have 2 years' COBOL experience preferably on IBM mainframes and Systems Programmers 3 years' on OS VSI. For Analysts, experience in data base or distributed systems would be an advantage.

Our Client's location in the South West offers an excellent working environment with good schools, easy commuting and a wide range of outdoor activities at nearby coastal resorts. Relocation assistance where applicable will make the move easier and there is an attractive benefits package with pension and life assurance schemes and a first class sports and social club. Salaries, which are dependent on experience and qualifications, will be supplemented by a productivity bonus. The prospects within this growing organisation are excellent.

Please send full career details, in confidence, to A. Whitbread, Moxon Dolphin & Kerby Limited, 60 St. Martin's Lane, London WC2N 4JS, quoting ref: AW/595/CW. Applications will be forwarded direct to our client. Please state in a covering letter any companies to whom you do not wish your application to be sent.

MOXON DOLPHIN & KERBY (GB) MANAGEMENT SELECTION

We are a medium sized Company involved in the manufacture of advanced aerospace electronics and are shortly installing an IBM System 34. We seek to recruit a

PROGRAMMER

with 3 to 5 years' experience of which 2 must have been in the use of RPG II, as the initial member of our technical team.

Previous experience of IBM Systems 32/34 and an interest in the application of computers to manufacturing/production management is essential.

The successful candidate will have specific responsibility for establishing and implementing, from a technical point of view, a programme of application development based on the IBM MAAPICS manufacturing system.

The Company offer a competitive starting salary, with an opportunity for development within the computer activity, together with an excellent fringe benefits package.

Please apply, in confidence to:

D. R. B. Spratling, Personnel Manager
PAGE ENGINEERING COMPANY (Sunbury on Thames) LTD.
Forge Lane, Green Street
Sunbury on Thames, Middlesex TW16 6EQ
Telephone Sunbury 87661

Charles Barker
Confidential Reply Service

Please send career details, listing separately employers to whom we should not forward your reply, to Charles Barker Recruitment Ltd., 19th Floor, Kennedy Tower, Snow Hill Queensway, Birmingham B4 6JB.

SYSTEMS ANALYST
INNOVATIVE ROLE

WEST MIDLANDS **c. £7,500**

Our Client, part of a large group, operates a distribution business aimed at providing a basic raw material to manufacturing industry.

Plans are well advanced to install a sophisticated management information system to include every operating centre within the organisation, and in order to advance further, an additional Systems Analyst is required. The person appointed will have considerable experience of designing and implementing teleprocessing systems:– this is clearly the main selection criterion, but specific experience of IBM CICS/DL1 will be extremely useful.

The appointment is West Midlands based, and the terms and conditions of employment reflect the status of a leading public group.

The post is open to men and women.

Please write reference M.303 on envelope.

THE SALES AND MARKETING BIT

Need for pre-call preparation often overlooked

I KEEP trying to persuade candidates who apply to my company for selling jobs that a job interview is a sales call where, as far as the salesman is concerned, he is the product. (That is also true of the potential employer too, but that's another matter.) Therefore his personal presentation, attitude and preparedness should be at least as effective as one might expect it to be for the most demanding sales situation.

Remarkably, this obvious and elementary piece of common sense tends to be ignored rather more than it is observed, for reasons which I must confess completely escape me.

Part of our structured interviewing system for salesmen contains the fundamental question, "What have you been able to discover about our client?"

The usual response ranges from pathetic confessions like "I couldn't find anything about them in the village library" and "I've asked around my friends, but they couldn't tell me much" to blatant cop-outs like "I just haven't had the time" or "I thought that's what I came here to find out!"

One can only assume that a large proportion of salesmen have a similar attitude towards the need for pre-call preparation in selling.

One of the essential ingredients for sales success is the ability of the salesman quickly to achieve professional credibility.

By that I mean total confidence on the part of the potential buyer that he would like to do business with this person. If such structure is to be attained then attention has to be paid to the principal elements from which it is created.

The primary considerations before a first meeting with a client should be:

1. Does my appearance reflect someone who is well organised, reliable and generally businesslike? (Even though you may prefer a straw hat and fig leaf at the weekends!)
2. Do I really know my product portfolio, and in particular do I have complete fluency within the product area most likely to apply to this client?
3. Have I brought along all the literature and data I will need to satisfy all the client's need for information?
4. Have I carried out sufficient research into this company in terms of its size, product and marketplace in order to have a real appreciation of the likely business opportunities and problems which might arise in the context of the product I am selling?
5. What are my objectives for this call? What is the purpose of my visit and what do I intend to achieve?

These basic principles are fundamental to the selling of any product, whether it be computers, carbon paper or even oneself in a job interview.

I do occasionally have the stimulation — wait for it — of a candidate who has taken the trouble to research into one of our clients, and I guess that's me half sold!

Who knows, maybe one day I shall experience the ultimate thrill of a candidate who has also researched into my company as well!

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Preferred ICL operations experience.
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Chief Executive's Department
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BOOK REVIEW

Law on shop floor

THE third and fourth booklets in the Law at Work series are now available from Labour Research Department, LRD, an independent trade union research organisation.

The third is called "Information disclosure" and costs 48p (including post and packing) and sets out the legal rights to information that have come into existence since 1975.

It includes sections on the Employment Protection Act, the Health and Safety at Work Act and the Companies Act as well as various rights to individual information about reasons for dismissals, terms of employment, redundancy and itemised pay slips.

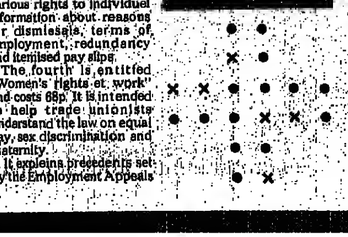
The fourth is entitled "Women's rights at work" and costs 68p. It is intended to help trade unionists understand the law on equal pay, sex discrimination and maternity.

It explains precedents set by the Employment Appeals Tribunal and the Court of Appeal; and the the provisions on maternity pay and maternity leave in the Employment Protection (Consolidation) Act 1978 are set out.

LRD says that the Equal Pay Act falls a long way short of establishing a right to equal pay for work of equal value.

The booklets are available from LRD, 78 Blackfriars Road, London, SE1 8HF. Tel: 01-928 3649.

Puzzle Answer



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